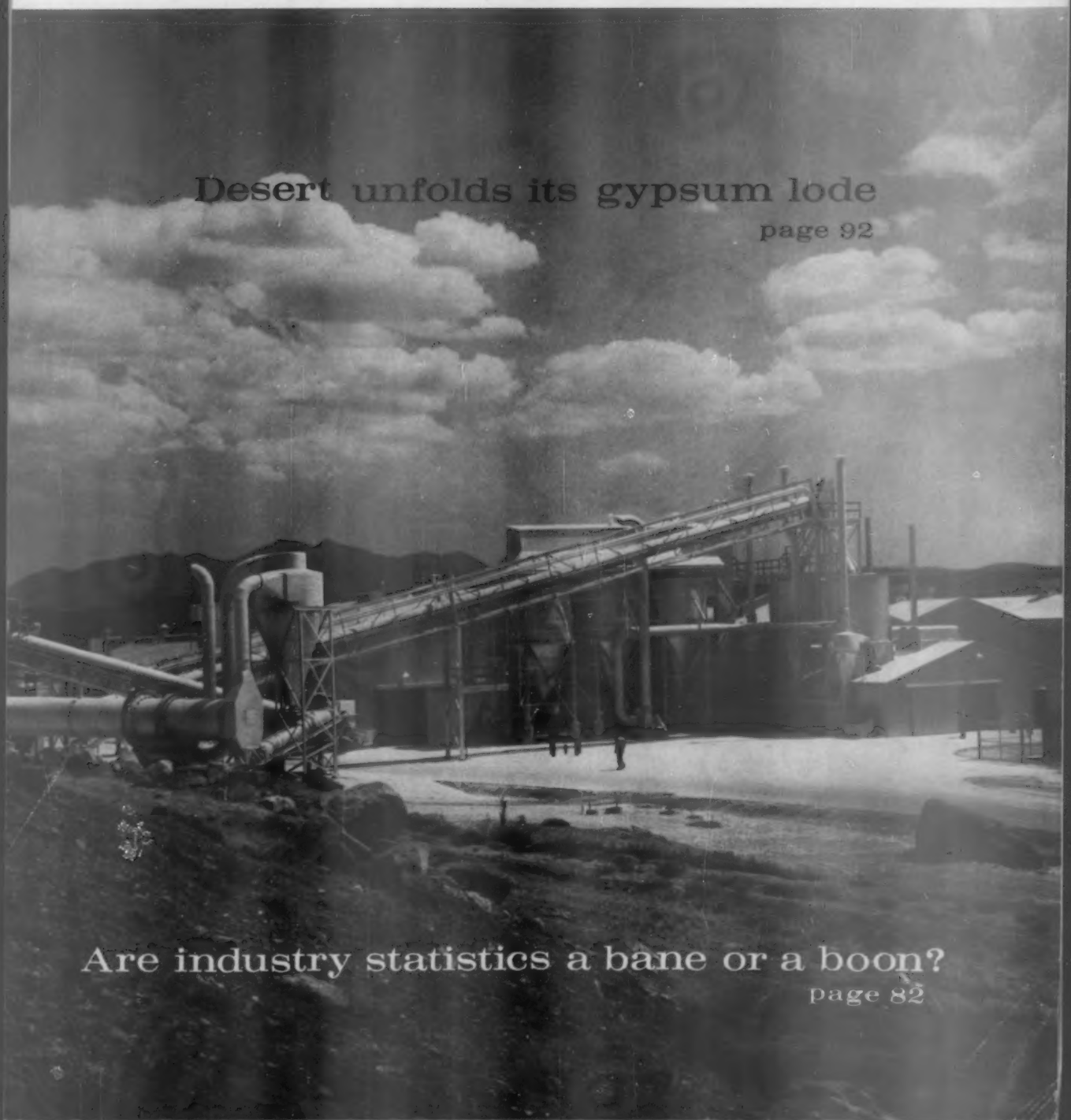
FEBRUARY 1961

ROCK PRODUCTS



Desert unfolds its gypsum lode

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Are industry statistics a bane or a boon?

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ANOTHER WESTERN PRECIPITATION

THERM-O-FLEX

FOR VIRTUALLY 100% EFFICIENCY IN CLEANING HOT KILN GASES!

Details on this "Thermo-O-Flex" Installation . . .

COMPANY
Portland Cement Company of Utah

LOCATION
Salt Lake City—in "downtown" area where high collection efficiency is imperative.

INSTALLATION
A series of "Multiclone" Collectors for preliminary clean-up, followed by "Therm-O-Flex" for final gas cleaning—both Western Precipitation products integrated into ONE coordinated installation, under ONE overall responsibility.

"THERM-O-FLEX" DATA
960 woven glass filter units in 16 groups of 60 each. Cleaning cycle—every half-hour. Installation is 56' high, 30' wide, 81' long.

CLEANING EFFICIENCY
Virtually 100% dust collection!

Whether you are building a new cement plant or modernizing existing equipment, get the facts on Western Precipitation's amazing new "Thermo-O-Flex" filter-type gas-cleaning equipment—**the equipment the cement industry is selecting THREE-TO-ONE over all other filter-type units combined!**

Backed by over a half-century of experience, "Therm-O-Flex" units offer these important advantages . . .

SILICONE-TREATED GLASS FILTERS!

"Therm-O-Flex" does not use ordinary glass-bag filters—but ***silicone-treated*** woven glass filters that are much longer lived and easier to clean!

HEAT-RESISTANT TO 600° F.!

"Therm-O-Flex" filters clean hot kiln gases with ease. Inlet temperatures as high as 600°F. offer no problems!

CORROSION RESISTANT FILTER UNITS!

"Thermo-O-Flex" filter units are of ***glass.*** They are unaffected by most corrosive gases and fumes!

CLEANED WITHOUT DESTRUCTIVE VIBRATION!

No destructive shaking or high-frequency vibration is necessary to clean "Therm-O-Flex" filter units. Instead, gentle ***collapsing*** action provides complete cleaning, thus prolonging filter life!

TROUBLE-FREE AUTOMATIC OPERATION!

Cleaning sequence is automatic—can be easily adjusted to a wide choice of time patterns to suit each requirement!

SEND FOR NEW "THERM-O-FLEX" BULLETIN

that gives detailed information on the most advanced and simplest method yet developed for cleaning gases from cement kilns, calciners, and other rock product operations!

Our experienced cement plant engineers will gladly make recommendations to solve ***your particular*** gas cleaning problems!

WESTERN
PRECIPITATION
DIVISION OF JOY MANUFACTURING COMPANY

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Cottrell Precipitators	Multiclone Dust Collectors	Therm-O-Flex Hi-Temp Filters	Dualaire Reverse-Jet Filters	Turbulaire-Doyle Scrubbers	Joy Microdyne Scrubbers	Combination Units	Holo-Flite Processors	Hi-Turbiant Heaters

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Still serving time after 5 years of hard labor

THAT limestone has been crushed once, will be crushed again, then sized, and stockpiled until delivery. A series of nine conveyor belts, working like a bucket brigade, keeps the rock moving through these stages at a steady 400-ton-an-hour clip.

Shut a belt down to repair it—and production would come to a standstill. So the quarry operators insisted on having belts that could handle heavy loads, stand the wear and tear of sharp rocks, take exposure to all sorts of weather.

They talked it over with B.F.Goodrich engineers, who recommended a rubber conveyor belt made with Nyfil fabrics. In this belt nylon is used for cross threads in the fabric to add extra strength without making the belt stiff and boardy. A belt made with Nyfil fabrics is more flexible, can carry heavier loads farther and higher, has greater impact resistance, and holds fasteners better than a belt made with all-cotton fabrics.

Nine B.F.Goodrich Nyfil belts were installed at the quarry. That was five years ago. Today, they're still going strong, show no sign of wear, have needed no maintenance, no repairs of any kind.

BFG distributors have full information on the Nyfil conveyor belts described here. And, as factory-trained specialists in rubber products, they can answer your questions about the many rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-958, Akron 18, Ohio.*

B.F.Goodrich

CONVEYOR BELTS

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February 1961

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1½ cubic yard electric P&H loads lime-stone in quarrying operation.

It pays to standardize on P&H

4 yard P&H Dragline digs aggregate under 20 feet of water.

Versatile 40 ton P&H Truck Crane uses drop ball for secondary fragmentation.

. . . the industry's most complete line

. . . a P&H with patented Magnetorque® increases production and cuts your unit costs

It's good business to standardize on P&H for all your needs . . . big, medium or small . . . there's a size and type for every job:

FULL-ELECTRIC AND DIESEL-ELECTRIC SHOVELS AND DRAGLINES—from 3½ through 10 cubic yards.

DIESEL EXCAVATORS—from ½ through 4 cubic yards.

TRUCK CRANES—from 12½ through 80 tons.

CRAWLER CRANES—from 20 through 110 tons.

Exclusive Magnetorque Drive on these machines is the key to their higher production, lower maintenance. On P&H Electric Shovels, Magnetorque Hoist Drive with up to 30% more digging power puts more material in the dipper—faster—with every pass! On P&H Diesel-Powered Shovels, Draglines and Cranes, patented Magnetorque Swing Drive gives up to 25% faster swings—in some models serves as propel drive also. P&H owners report up to 10% more production, at lower operating cost, thanks to Magnetorque.

Whether you're loading rock . . . digging sand and gravel . . . stockpiling or general utility work—there's a P&H to fit your requirements. Compare before you buy—see why P&H gives you more production and requires less maintenance . . . why it pays to standardize on P&H.

HARNISCHFEGER P&H

Milwaukee 46, Wisconsin

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Wanted: In 12 days, 40,000 tons of 1" minus

Two Diamond Plants Do Job

All belt conveyors on the new model 70 are 30" wide, 5-ply 28 oz. duck, for maximum carrying capacity and minimum spillage.

The model 66 is an "old pro" that consistently exceeds its rated capacity of 100-125 cu. yds. per hour (material passing a 1" screen based on 25% oversize).

Diamond makes everything for the aggregate producer

Jaw Crushers • Roll Crushers • Conveyors • Screens and Washers • Feeders and Bins • Portable and Stationary Crushing Plants for Rock and Gravel.

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To keep a road repair project ahead of schedule 40,000 tons of 1" minus base fill was needed in a hurry. To get it, the contractor, over a week-end moved two Diamond plants and two shovels across county to a new pit location and lined up 18 trucks of 27 to 44 ton capacity. On Monday morning the plants were grinding out the needed aggregate from material requiring 50% crushing. Despite several spells of rain and three moves in the pit, the contract was filled—profitably.

The Diamond 66 and the new Diamond 70 portable plants did the job. Jaw crushers, 10" x 36" quickly reduced large rock to uniform size. The roll crushers (30" x 20" on the 66 and 32" x 24" on the 70) stepped up output by eliminating reruns. Balanced vibrating screens separated material thoroughly, belt conveyors carried loads quickly and smoothly—a synchronized line-flow system that moved material through the plant without delay . . . no by-passes, no bottlenecks.

Combine the production advantages of these two plants with full portability in the pit or on the road and you can see why this producer accepted a tough rush contract—and made money.

Check with your Diamond distributor for complete information on the Diamond 66 and the new Diamond 70.

DIAMOND IRON WORKS

DIVISION

GOODMAN MANUFACTURING COMPANY

Halsted Street and 48th Place • Chicago 9, Illinois

DIAMOND

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PLANNING AND GOOD EQUIPMENT SET A RECORD!

When and if you ride over the 33 miles of 4-lane Interstate 80 from Stuart, west of Des Moines, to Route 71 in Iowa, you might be reminded that the road base constituted one of the greatest aggregate production jobs in the history of road building.

To do the job, E. F. Schildberg Construction Company of Greenfield, Iowa, with highly competent planning and good equipment, delivered a million tons of crushed limestone (minus 1 in.) in 4½ months. For 7½ months the production of the Cedarapids plant was over 1,000 tons per hour. Many days the plant produced more than 12,000 tons.

All of the vast amount of shot limestone to supply the crushers was handled by four Northwest shovels.

Here again Northwests proved their outstanding ability for output in rock. But more than that, they proved their dependability on a highball job where delay would have been critical.

Your Northwest is a *real* Rock Shovel. They get the job done — not just for the day — but for the week, the month — year in, year out. That's what makes money.

If you want output — if you want to make money, you can bank on Northwest — there is no finer equipment built.

View of the tremendous plant with pit in background.

NORTHWEST ENGINEERING COMPANY
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1514 Field Bldg.

S-80-9-S

3/4 to 3
Cubic Yard Capacity

NORTHWEST

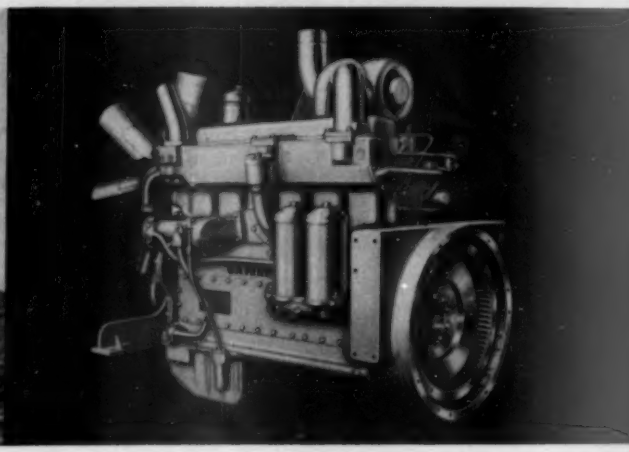
NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ Yd. to 3 Yd. Capacity

PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity

NEW CAT NO. 14 SERIES C MOTOR GRADER

Compact engine plus many other refinements assure top performance, easier servicing, long life



Important changes make up the new Series C No. 14 Motor Grader—big improvements throughout to give you better performance, long life and servicing ease:

NEW COMPACT 150 HP ENGINE The short, rigid block and stress-relieved crankshaft give greater strength and shock resistance. New cylinder head design resists distortion yet has superior cooling characteristics. Large water pump with cast-iron impeller, ceramic seal face, and carbon type seal combined with a 20 per cent increase in radiator capacity improves cooling, lengthens life.

NEW STARTING ENGINE All-weather starting with this new two-cylinder vertical gasoline engine is assured. Replacing the horizontal engine, this design features aluminum pistons and overhead valves for improved performance. Bore is 2.38″, stroke is 2.38″, and compression ratio is 8:1. Over-running clutch in starter pinion prevents damage to starter engine when diesel starts, a year-round starting plus.

NEW SERVICING EASE An advanced fuel system is designed for easier servicing and more efficient operation. Compact fuel injection pumps with barrel and plunger assemblies enclosed in housing help reduce wear, lengthen service life.

Plus all the features that made the No. 14B the most versatile motor grader in the "big machine" field . . .

EXCLUSIVE OIL CLUTCH —provides up to 2000 hours of service without adjustment, equal to about a year of "adjustment-free" operation.

DRY-TYPE AIR CLEANER —removes 99.8 per cent of all dirt from intake air. Can be serviced in five minutes.

MECHANICAL CONTROLS —provide easy engagement. "Anti-creep" lock makes blade stay put under load.

FULL VISIBILITY —operator has unobstructed view of job even while seated.

Now, all Cat Motor Graders feature the compact engine. Like the new No. 14C, the 85 HP No. 112E, the 100 HP No. 112F, and the 115 HP No. 12E are all designed to give you the highest production at the lowest possible cost. Your Caterpillar Dealer can give you the facts and figures. He can prove it both on paper and on your job. Call him today.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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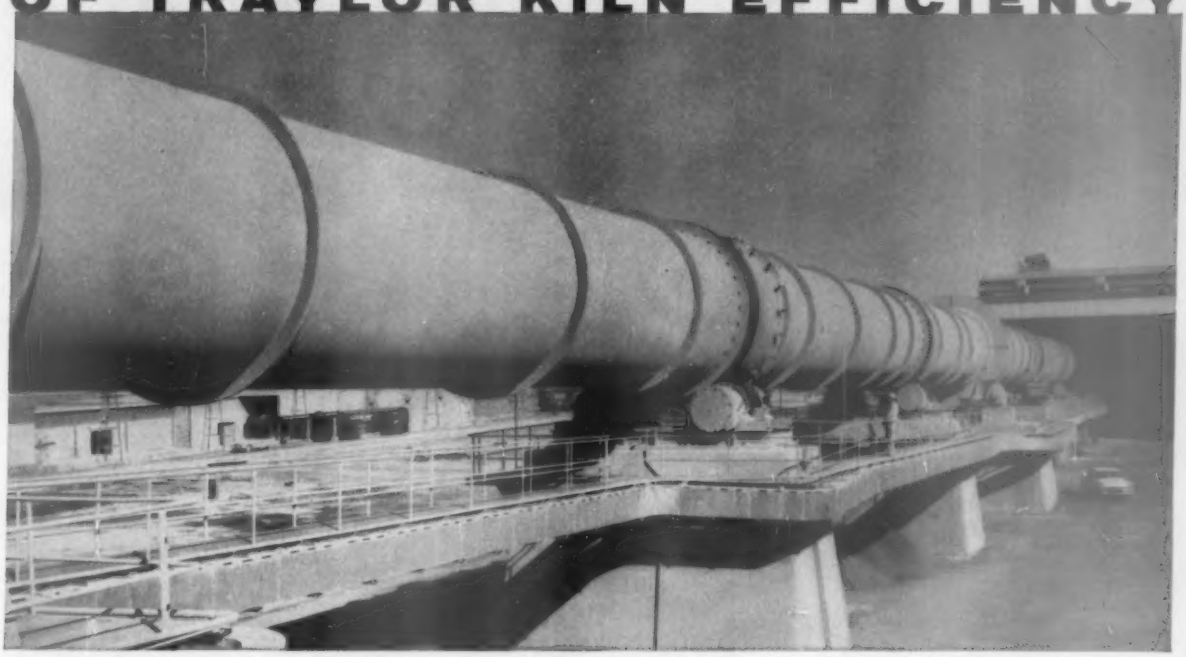
THE NEW NO. 14C MOTOR GRADER— MADE FOR THE BIG JOBS

450 FEET

OF TRAYLOR KILN EFFICIENCY



Shown above is one of two 12′ x 450′ Traylor rotary kilns designed and built to meet the requirements of the Standard Lime and Cement Company, Martinsburg, West Virginia. Both are wet process kilns driven by dual drives with forged steel riding rings and forged steel supports. These kilns feature the Traylor-designed chain systems and dust return scoops. They are fed by a Traylor slurry feeder.

Write today outlining your kiln requirements and let our engineers make recommendations . . . or write for Bulletin No. 1115.

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TKA-8

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THE USEFULNESS OF A ***LIMA AUSTIN-WESTERN***

ONE MAN RUNS THIS PORTABLE PUSHBUTTON CRUSHING PLANT

Only one man is required to operate this Lima Austin-Western portable crushing and screening plant. From his operating platform he can see and control every phase of this efficient, high-speed setup. Diesel engine operates crushers; electric generator powers all other operations. Design simplicity eliminates troublesome clutches, chains, sprockets and gearboxes. Maintenance is reduced, tonnage costs are kept down.

And look at the compactness of this completely portable unit. It's self-contained, rubber mounted—ready to roll from job to job. Works near end-use sites to cut trucking time and costs. Lima Austin-Western offers a full line of portable or stationary crushing, screening and washing equipment, including jaw crushers, roll crushers, feeders, screens, elevators, conveyors and bins. To see it in action, get in touch with our distributor nearest you or write to us for full details.

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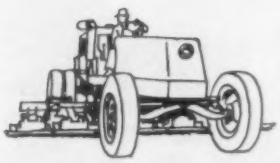
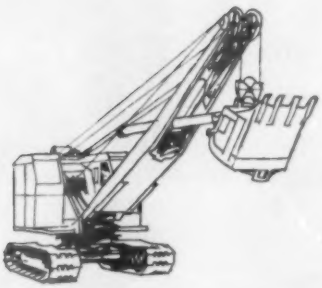
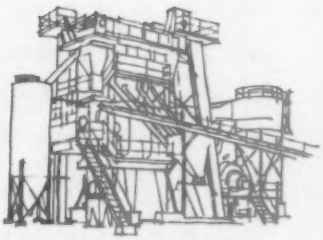


LIMA MODEL D ROADPACKER —Six vibrating shoes compact fast and deep for profitable single-course construction; available in 12-shoe Super model.



LIMA SHOVELS AND CRANES —Interchangeable front ends. Shovels to 8 yd.; cranes to 140 tons on crawlers, 80 tons on rubber; draglines variable.



LIMA MADSEN ASPHALT PLANTS —available in models with batching capacities from 1000 to 10,000 lb.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

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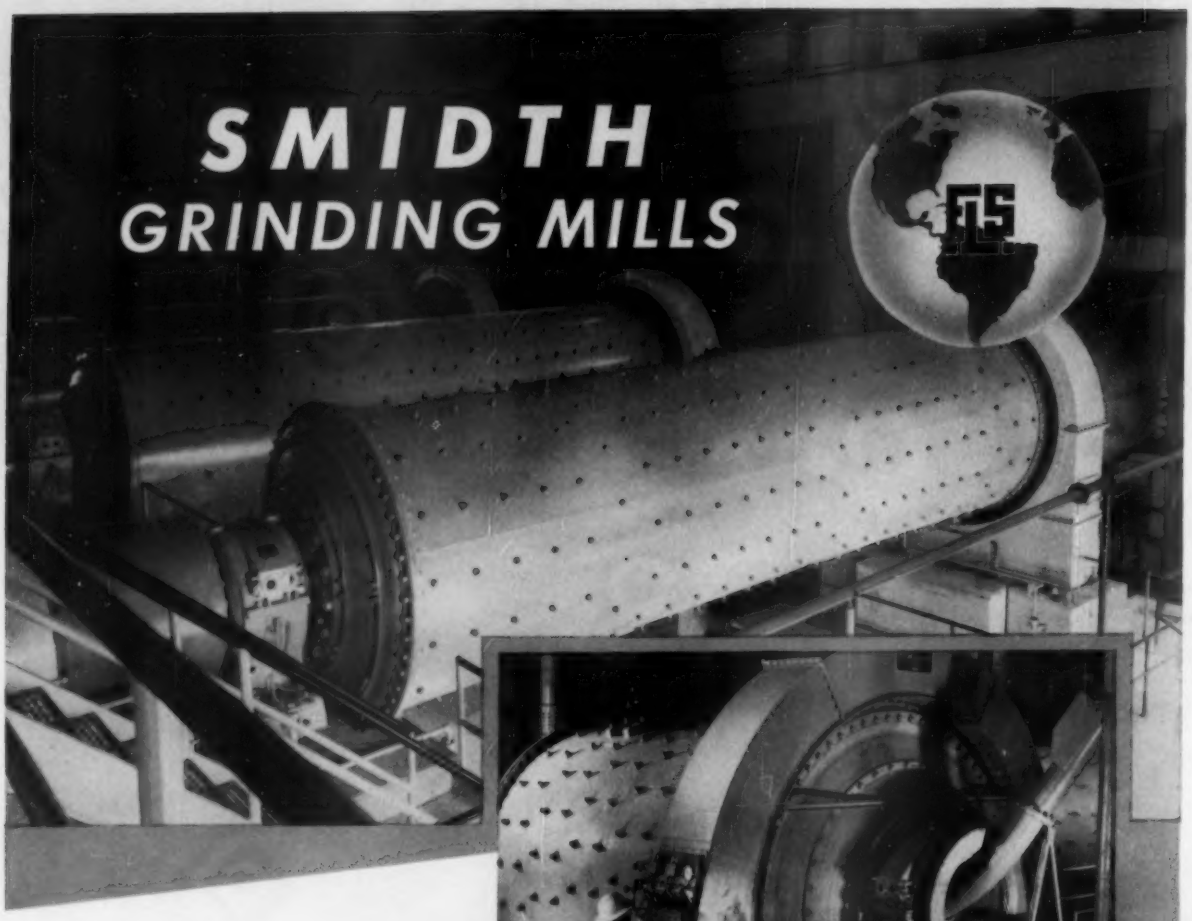
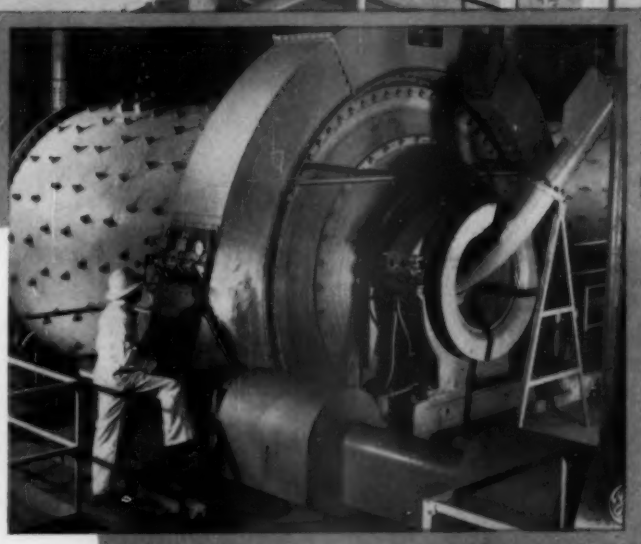
SMIDTH
GRINDING MILLS





Ball Mills and multi-compartment Unidan Mills for wet and dry, open and closed circuit grinding and airswept Tirax Mills for simultaneous drying and grinding.

Special features include the Smidth slide shoe bearing and the Symetro Drive.

Upper photo: Unidan Mills, Symetro driven, with one slide shoe and one trunnion bearing. *Lower photo:* Gear driven Ball Mill.

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WHAT'S HAPPENING

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

Blow the man down might be the way Canadians help their skiers descend the slopes, if experiments in Quebec go awry. Scientists have found that ammonium nitrate fertilizer—a blasting agent—sprinkled on soft melting snow changes it in 5 min. to a hard-packed surface. Solid enough to support a man's weight, it is said to be ideal for slalom racing.

Electronic tape measures may soon replace rod-and-chain techniques for surveying. That's the gist of a series of papers published recently by the Highway Research Board, National Academy of Sciences and National Research Council. Two electronic systems are undergoing tests for measuring distances along proposed highways, either by actually taping across the ground or by geometric computation. Both devices are lightweight and portable, say the authors, and require just one man at each end of the line. The Geodimeter transmitter type emits a modulated light beam which travels to a reflector at the other end of the tape and back. Trip time is obtained in billionths of seconds, then converted to miles, feet and inches. The Tellurometer works much the same way, except that it transmits a series of high-speed impulses to a receiver and back. Five technical papers are contained in Bulletin 258, entitled "Electronic Surveying." They are available from the Highway Research Board, Washington 25, D.C.

Spent sulphite liquor from pulp mills in Wisconsin and Minnesota is being scrutinized for another potential use. A new research project at Michigan College of Mining & Technology at Houghton is aimed at finding a way to use it as a binder in pelletizing low-grade iron ore. Sponsored by the Sulphite Manufacturer's Research League, the work will focus on concentrates of the spent liquor up to 5 percent of the ore to eliminate the present expense of high-temperature hardening. It may also do away with the regrind step needed with some binders now in use.

Sand flies from the end of a pipe down in Miami, Fla. The action is the result of county engineers putting their heads together over a problem: Biscayne Bay had an over-abundance of sand and Haulover Beach didn't have enough. They devised a simple solution by piping sand that settles in the bay onto the beach where it is blown into the eroded areas.

Radium paint may go the way of the dollar watch that it was used on. The most promising substitute to be developed yet contains tritrium—"heavy" hydrogen. This government-controlled radioactive element has been released for the first time and only for use on watches. When tritrium is mixed with phosphorus, light is emitted that has higher initial brightness than radium paint and will stay brighter much longer. There is no hazard from radiation, and cost for commercial uses will be about the same as radium paints.

Ants are leading geologists to coal seams in West Africa, according to news from Nova Lisboa, Angola. Prospectors who broke down an ant hill discovered that the interior was lined with dark brown instead of the usual grey material. Investigation proved it to be lignite, apparently selected by the insects for cooling their nest. Since the presence of lignite usually indicates soft coal beneath the surface, the geologists began to dig. Now mining operations have started on the site where seams were uncovered, and the scientists are poking into other ant hills.

Precast and prestressed concrete bridge sections will go into the 3-mile Pensacola Bay bridge in Florida. Very similar to those used for Lake Pontchartrain's long span, they require the same mass-production techniques and equipment. The monolithic deck units spans 60 ft. and weigh 156 tons. The elements are brought by barge from the production yard at Mandeville, La. Some of the prestressed cylinder piles are 164 ft. long. They are believed to be the longest of their type ever used in U. S. bridge construction.

Atomized asphalt is being tested as a metal preservative in one of two new uses for the material. It was used on a railroad bridge by Jersey Central Railroad, reports American Petroleum Institute. Much cheaper than paint, it effected labor savings, too, because one coat was all that was needed. Another new use for asphalt is as a roadbed stabilizer. Illinois Central Railroad sprayed a test section of roadbed with the material to preserve and stabilize the rock ballast and preserve the cross ties.

Colorado is trying out asbestos fibers in its paving mix. The State Highway Department hopes to upgrade poor-quality aggregate found in the eastern part of the state with the material. Test strips will be installed on U. S. 24 near Colorado Springs and on U. S. 36 west of Last Chance. Johns-Manville and Clute Corp. are donating about 33 tons of asbestos worth approximately $5,000 to the experiment. Emil G. Swanson, staff materials engineer for the Highway Department, believes that asbestos fibers will increase stability at high temperatures and resistance to impact and abrasion at low temperatures, thus cutting down on cracking. If the experiment is successful, the addition of asbestos fibers could hike the cost of road building by $2,000 a mile in the state.

Single crystal whiskers of magnesium oxide are a new development of Semi-Elements, Inc., Saxonburg, Pa. The crystals are 3 to 4 mm. long and will be useful in magnesium oxide research. They are expected to be particularly adaptable to making high-temperature semiconductors with high mobility and high-energy band gap.

Underground limestone caves are getting more attention. In addition to Ozark Terminal's cave reported in the June 1957 ROCK PRODUCTS. The Wall Street Journal has spotted half a dozen other caverns now serving industrial users. Frozen food is stored in part of an underground limestone mine near Kansas City, while mushrooms are raised in the unvarying temperature and humidity of a mine near Butler, Pa. Pittsburgh manufacturing companies are storing vital records in abandoned coal and limestone mines in western Pennsylvania. New York banks and financial houses are storing their records in secret locations in limestone caves in the Hudson Valley.

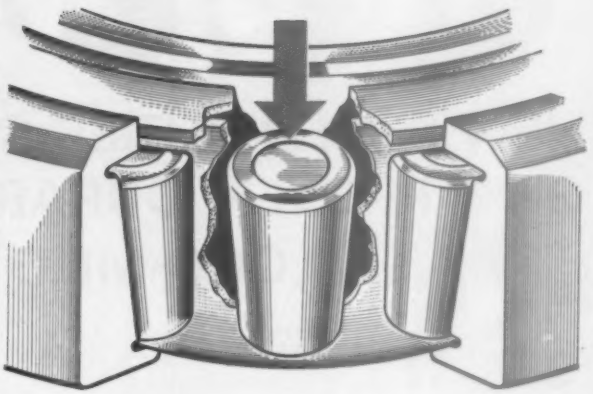
LUBE LOGIC

Three ways to chop downtime

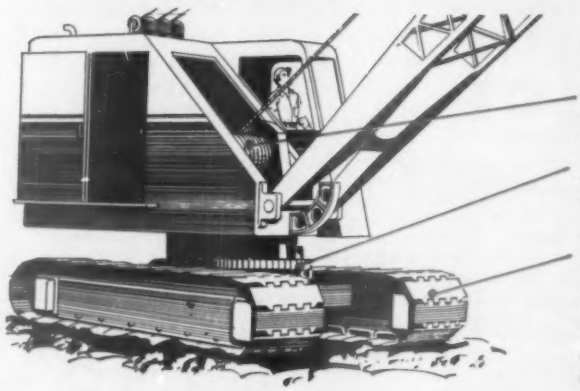
Change the differential lube, save the bearings

It's vitally important, on new trucks, to change the differential lubricant promptly at the mileage recommended by the manufacturer. By that time, the factory-installed lubricant may be highly abrasive, because it picks up minute particles of metal worn off the gears during break-in. If you don't change the lubricant you'll get very rapid wear of differential gears and bearings.

One of the most likely spots for this wear to show up is on the raised shoulder at the ends of antifriction bearing rollers. You'll know it's worn if, upon inspection, you find that the recessed area in the center of the roller ends has disappeared. If roll-end wear persists long enough without correction, pinion and ring gears get noisy. When it comes to that, your only option is to replace the bearing. Moral: whatever you do, don't stretch lube intervals, especially on new vehicles.



Some important don'ts on power shovel lubrication



It's an old Texaco maxim that over-lubrication is sometimes worse than none at all, and there are three vital spots on power shovels where this is particularly true:

1. **WIRE ROPE** that winds onto drums fitted with clutches should be lubricated very sparingly. Otherwise the lubricant may get onto the clutch faces and cause slipping.

2. **TURNTABLE ROLLER PATH** should never be lubricated, unless it's the double-flange type with hook rollers. Lubricant will cause the rollers to slide and wear flat. Lubricate the bearings of turntable rollers sparingly to avoid drip on the turntable path.

3. **TREADS** should never be lubricated. (We're talking about the tread only now; the track rollers or idling assemblers usually need frequent lubrication to keep them free of grit.) The links that connect the individual treads are designed to operate without lubrication. Any oil or grease on these pins will pick up abrasive dirt, which would act as a lapping compound on the pins, and drastically shorten service life.

No-sweat way to adjust crawler treads

Crawler treads are easier to adjust if you dab a little Texaco Threadtex on the adjusting screws. The Threadtex stays put through months of tough service, keeps the screws free-turning and corrosion-proof.

TEXACO LUBRICATION ENGINEERS

If LUBE LOGIC doesn't solve your problems, call your local Texaco man. Anytime, all the time, he's your best source of money-saving lubrication ideas. Don't forget that "lubrication is a major factor in cost control."
Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

TUNE IN: TEXACO HUNTLEY-BRINKLEY REPORT, MON. THROUGH FRI.—NBC-TV

TEXACO

Throughout the United States
Canada • Latin America • West Africa

Save on construction costs with the new '61 FORD TRUCKS

NEW SUPER DUTIES CUT OPERATING COSTS, GIVE PROVEN DURABILITY THAT'S BACKED BY A 100,000-MILE ENGINE WARRANTY

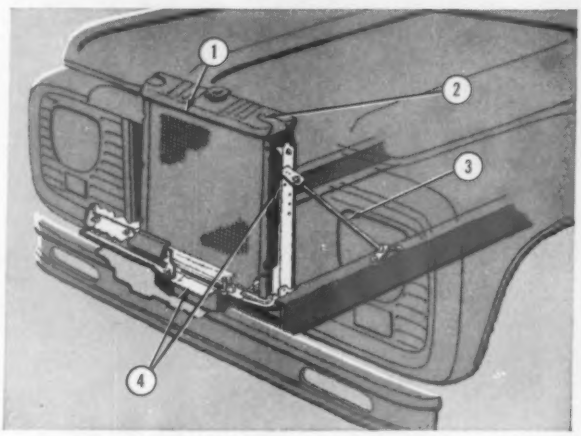
New 100,000-mile warranty on Super Duty V-8 gas engines is the most liberal in the industry. On 401-, 477- and 534-cu. in. V-8's, Ford Dealers will replace any major engine part (including block, heads, crankshaft, bearings, valves, pistons, rings) found to be defective in materials and workmanship providing trucks are used in normal service. The warranty covers full cost of replacement parts for 100,000 miles or 24 months, whichever occurs first . . . full labor costs for first year or 50,000 miles, sliding percentage scale thereafter. Never before have you had such protection . . . such evidence of long-term durability!

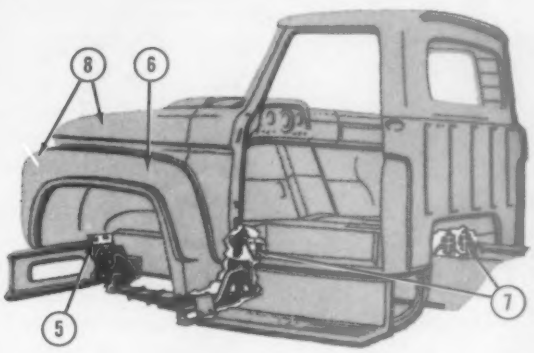
And you save with greater gas economy! Certified tests prove the new Super Duty V-8's give up to 20% better mileage. In addition, Ford's new lightweight, *extra-hi-tensile* single-channel frames (standard F-850—F-1000) give you long-lived durability combined with a lightness of weight for added payloads. All in all, you get proven components and design features . . . in trucks built for easier maintenance and lower running costs.

Save with Ford T-Series Super Duty Tandems for exceptional durability, big payloads and low operating expenses. Ford T-850 and T-950 Tandems with Super Duty V-8 engines have rugged double-channel, hi-tensile frames for maximum strength, minimum weight. And they provide a wider range of chassis options so you can choose the right power train and load-carrying components for any job. Eaton and Timken rear axles are now available in bogie assemblies with up to 38,000-lb. capacity. And lightweight aluminum walking beams, wheels and gas tanks are available to keep chassis weights low . . . payloads high.

Ask your dealer about Ford's full tandem line . . . five T-Series with GVW's ranging from 28,000 lb. to 51,000 lb. and GCW's up to 75,000 lb.

SAVE WITH NEW HEAVY-DUTY CONSTRUCTION THAT DOUBLES CAB, SHEET METAL AND RADIATOR LIFE





① **Save with Ford's exclusive "lock-seam" radiator construction** that doubles the solder area at key seams for greatly increased strength and longer radiator life.

② **Save with heavier-gauge metal on radiator tank and header.** Tanks and header have thicker walls to resist vibration, jolts and corrosion for greater reliability.

③ **Save with independent radiator mountings,** separate from front-end sheet metal. This means that road shocks and shakes are not transmitted to the radiator through sheet metal . . . tanks, tubes and connections last longer, require less maintenance.

④ **Save with "horse collar" mounting** for extended radiator life. This new mounting on resilient rubber at the center of frame cross member soaks up any frame flexing . . . cuts wear and tear on entire cooling system.

⑤ **Save with independent fender mountings.** Fenders are bolted to a rubber-cushioned transverse bracket at the front and a frame-mounted bracket at the rear. This mounting, independent of both cab and radiator, eliminates stress transfers for increased fender life.

⑥ **Save with removable fenders.** The quick and easy removal of only 8 bolts per fender provides faster service accessibility to the engine area, saving valuable maintenance time.

⑦ **Save with new 3-point cab mounting system** for greater cab durability. Two outboard front mounts plus a centered "twin" rear mount provide a triangular system that holds the cab stationary while allowing the frame to move independently . . . reducing strain on the cab.

⑧ **Save with 42% heavier-gauge sheet metal** in fenders, hood, cab floor pan and toeboard for greater strength, greater durability.

Save with Ford's new Full-Torque flywheel power take-off . . . now available on T-750's and up, to power construction equipment like transit mixers. It's much simpler and more efficient than long, complicated hookups needed with the front-end drives. And the flywheel PTO is lighter in weight—only 105 pounds—for greater payloads.

FORD TRUCKS COST LESS

YOUR FORD DEALER'S "CERTIFIED ECONOMY BOOK" PROVES IT FOR SURE...

FORD DIVISION, Ford Motor Company

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EDITORIAL

by GEORGE C. LINDSAY

Tug of war on depreciation?

ALL THE FORCES seem to be lining up for a hassel in this Congress on revision of equipment depreciation methods. The troublesome problem has been batted around since 1954, when Congress did give some relief by allowing companies faster tax write-offs in the early years of equipment life.

Experience since then has shown that erosion of invested capital has continued. Equipment-using taxpayers have been plagued by high taxes because, in some part, Congress has refused to provide for depreciation allowances on inflated price tags for replaced machines.

If this Congress solves that problem—and it should—it surely will have to resolve at least two viewpoints in economic theory. One faction insists that economic growth of the private enterprise system stems from small, medium-sized and new businesses. To compete with big business, smaller ones should have the same right to grow, which they can do only through retained earnings. Taking these earnings away through over-taxation will kill the opportunity for our economy to prosper, it's argued.

Another faction feels that Washington can't afford to give relief on tax income that is needed for operation of an ever-growing federal government with increasing world-wide responsibilities. Must have more tax money, not less, they say, and the way to get it is to tax more. Who's right?

You, as businessmen, know that this country has thrived on a high rate of investment of capital for improvement and modernization. That's what has made tax revenue grow.

There are hopeful signs that this Congress may do something constructive about the depreciation problem. Treasury Department found, through results of a survey to thousands of businesses, that business isn't satisfied with the present tax laws. Two bills already have been re-introduced into this Congress, having failed to pass before. One provides for an allowance of reinvestment depreciation deductions; the other supports the reinvestments earnings principle.

But you can look for a tug of war in Congress, just the same.

Either of those bills or a similar bill should be made into law. If not, Washington may find soon that a needed business incentive to invest for expansion will be lost, and that tax revenue flowing into government coffers will be at reduced rates.

CUT COSTS *LESS DOWN TIME AND UP-KEEP*

GIORDANO BROS. of MARKHAM, ONTARIO operate this diesel-electric Telsmith 367 Portable closed circuit crushing-screening plant. Plant mounted 60 KW Generator powers individual electric motors on conveyors and screen; simple push-button control—cut power and up-keep costs. (*Below, lower left*) Control cabinet with 3 receptacles for powering stock piling conveyors.

...get HIGH CAPACITY crushing and PRODUCT FLEXIBILITY

Crushing over 215,000 tons of granular road building material in two years, this Telsmith Portable closed circuit crushing-screening plant has had practically no down time; its single 367-S Gyrasphere Crusher still has its original manganese steel liners. ● Plant capacity is high—up to 300 tph. ● Its 367 Gyrasphere has a big ratio of reduction—7″ feed down to ⅝″, with little oversize. ● The big 4-bearing, 4′ x 12′, 2½ deck Vibrating Screen can make 3 product sizes in one pass. Sizes may be blended by simple adjustment of under screen gates. ● Crusher; Screen; 30″ conveyors, adjustable stroke Plate Feeder; Feed Hopper with removable grizzly; non-slip 84″ x 24″ Rotary Elevator—*all Telsmith heavy duty units, the same as used in permanent plants to insure the low cost, profitable service today's commercial producers demand.* For full details, get illustrated Bulletin 276. P-24-161

SMITH ENGINEERING WORKS

508 E. CAPITOL DRIVE, MILWAUKEE 1, WISCONSIN

DIVISION OF Barber-Greene

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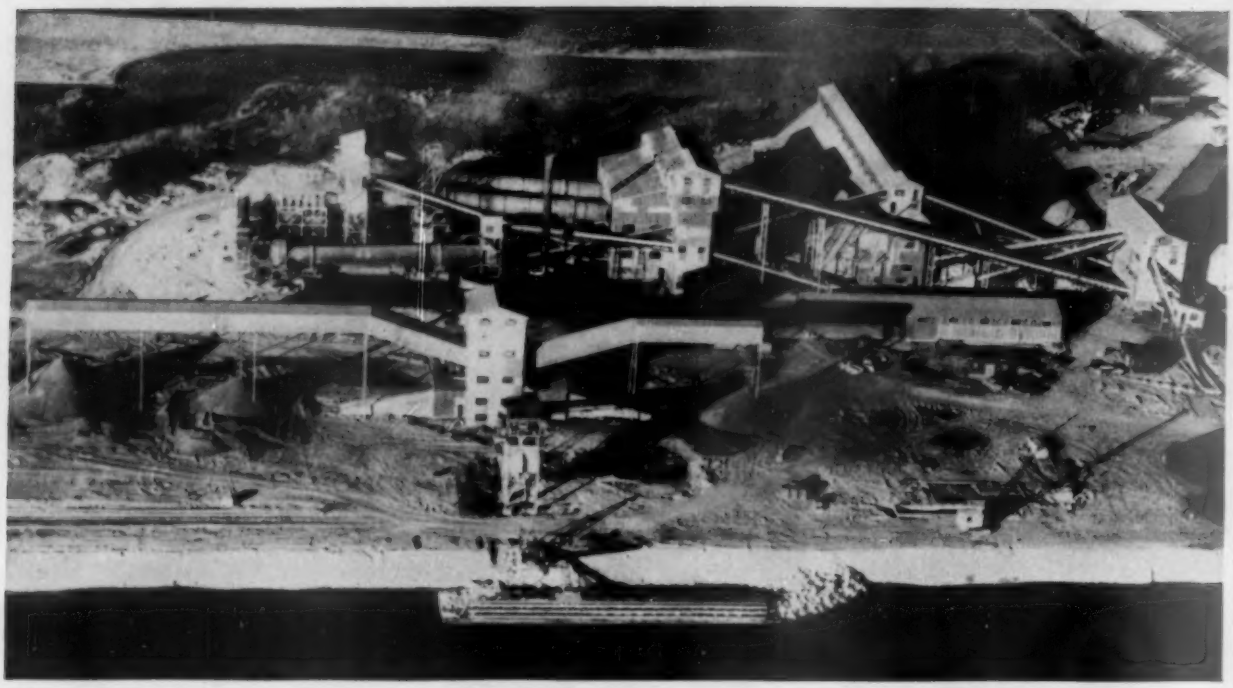

All sections of Material Service plant are shown here, including: foreground barge-loading and finished-product stockpiles; left dryer, kilns, and kiln firing buildings; right of center—raw shale storage, primary crushing and screening building.

MILE-LONG CONVEYOR SYSTEM USED IN NATION'S LARGEST EXPANDED-SHALE PLANT

Ground level plant view shows how mile-plus conveyor system is interlaced between buildings to provide a highly flexible materials handling operation.

View from primary crushing and screening building shows seven of 35 Barber-Greene conveyors in plant. Three units at left convey material to kiln feed bins in firing building. Two center units are in primary crushing-screening circuit. Conveyors on right move shale from raw screens to raw shale storage building.

Three Barber-Greene tripper conveyors that discharge shale and coal into appropriate kiln feed bins are shown atop kiln firing building.

35-unit Barber-Greene belt conveyor installation mechanizes highly efficient lightweight aggregate plant

The Ottawa, Ill., plant of Material Service, a division of General Dynamics Corporation, produces 1,500 cu. yds. of Materialite, an expanded-shale aggregate, daily. One of the most advanced plants of its kind in existence, it utilizes 35 Barber-Greene Conveyors, totalling 6,375′ in length, to move materials from truck-dump through a variety of processing phases, to finished-product stockpiles, from which it is loaded into railroad cars, trucks, or barges.

The result of nearly five years of investigation and research, the plant is the largest of its kind in the nation. And efficient plant production since the opening late in 1957 has more than justified the painstaking preliminary study by this aggregate producer.

The conveyor system – one of 34 Barber-Greene systems operating in Material Service plants around the nation – gives unusual flexibility of operation through three screening and three reduction phases, plus a wide blending range in kiln feed. Conveyors vary from 24″ to 36″ in width, and include a total of 1,473 heavy-duty idlers. The system has given trouble-free performance since plant operations began. Ability to stand up under the most severe abrasive and dusty conditions encountered in applications such as this have made Barber-Greene Conveyors the No. 1 choice of all types of aggregate plant operators.

Your belt conveyor equipment headquarters

Representatives in Principal Cities of the World

Barber-Greene BG

Main Office and Plant AURORA, ILLINOIS, U. S. A.

Other Plants: DeKalb, Milwaukee, Detroit, Canada, England, Brazil, Australia

CONVEYORS • LOADERS • DITCHERS

ASPHALT PAVING EQUIPMENT

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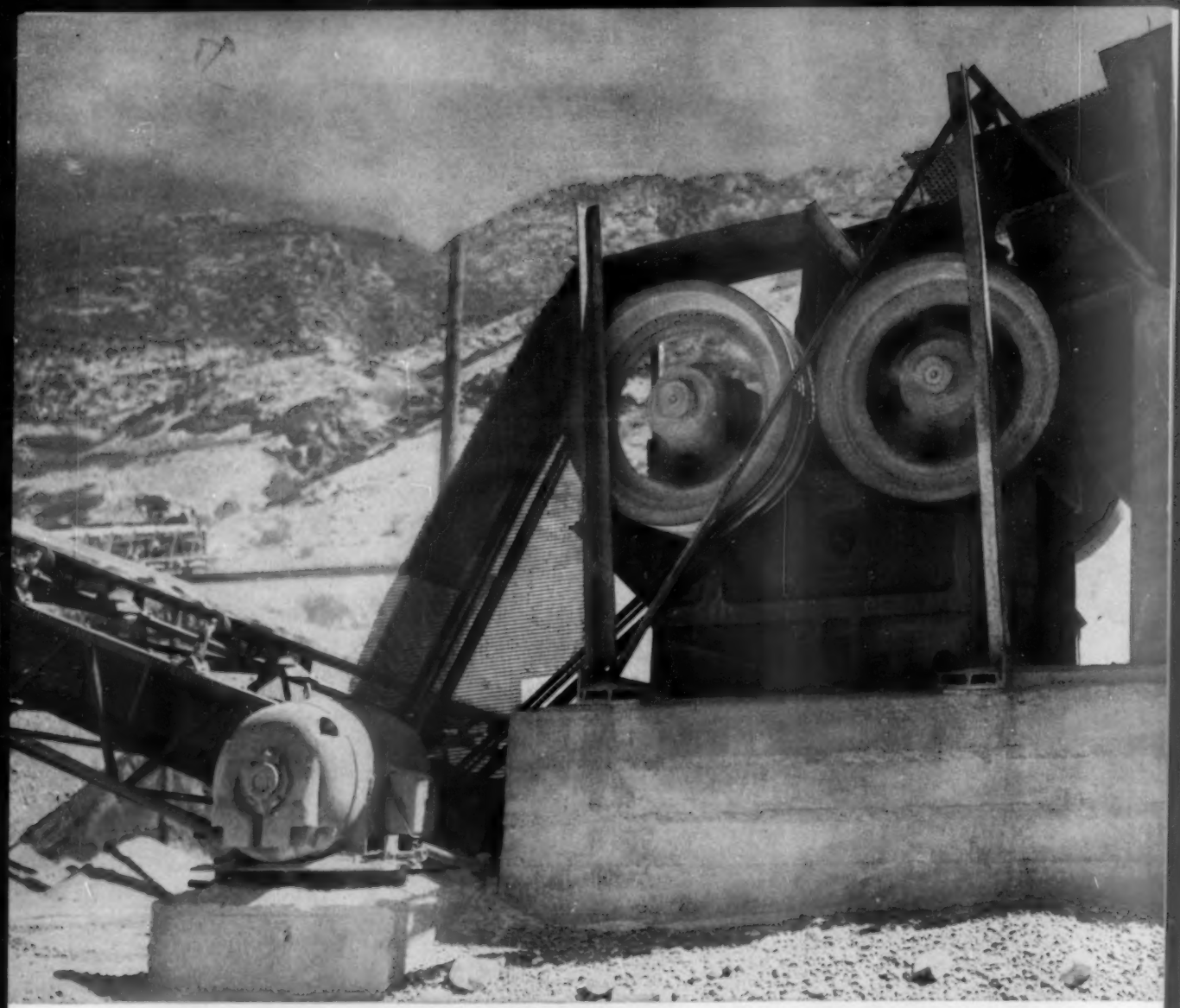
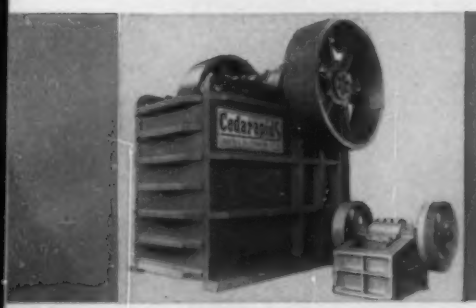
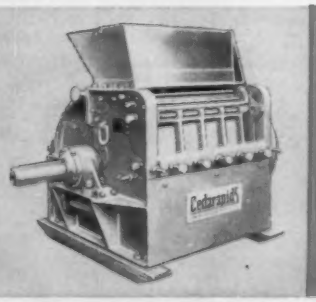


YOU'RE MONEY AHEAD with every job-proved, high capacity crusher in the



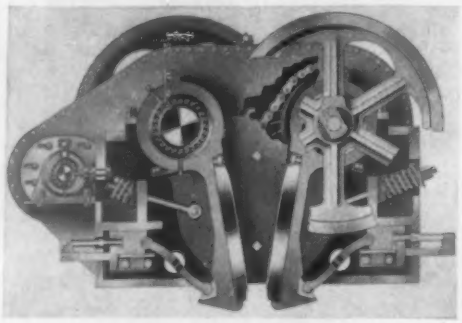


Single Jaw Crushers available in a complete range of 13 sizes, ranging from the big-producing 42″ x 48″ to the 10″ x 16″ size in the roller bearing type. Plain bearing single jaw crushers range from 9″ x 16″ to 10″ x 36″. Three sizes of Twin Jaw Crushers, from 12″ x 16″ to 18″ x 36″, available for stationary installations or in portable plants. Low maintenance cuts costs.

Six models of Double Impeller Impact Breakers include sizes from 22″ x 22″ to 53″ x 60″ to meet volume requirements up to 1000 tons per hour. *Counter*-rotating impellers, an exclusive Cedarapids design, permit breaking rock with rock to utilize the entire breaking chamber, thus saving manganese wear and reducing maintenance. Two sizes of Single Impeller Impact Breakers also available for intermediate reduction to increase plant capacity.

Exclusive Cedarapids Hammermill features give the material a combined impact breaking and milling action that produces big volumes of uniform cubical shaped aggregate without slabs or slivers, as well as high quality ag-lime, and turn out more tons per hour than other similar types of equipment. Four sizes, from 20″ x 33″ to 50″ x 40″.

Extra Output . . . Extra Profits . . . for 14 years with CEDARAPIDS TWIN JAW CRUSHERS



DESIGNED WITH THE SAME CEDARAPIDS JAW CRUSHER FEATURES THAT SET THE STANDARD FOR THE INDUSTRY

- Eccentric shaft extra heavy to absorb strain and minimize shaft flexure
- Adjustable-tension timing chain drive prevents trouble due to possible shaft flexure. No fine-cut timing gear that requires critical alignment
- Heavier-than-average self-aligning pitman and side bearings absorb side thrust
- Reinforced, electric-welded crusher bases are completely stress-relieved for longer life
- Extra heavy flywheels insure smooth operation under surge feeding with minimum power

Complete Cedarapids Line

Where high capacities of small sized aggregates are required, Cedarapids Roll Crushers are the best units for secondary reduction. Material is dropped between the rolls to penetrate deep into the crushing area and permit faster feeding. Special feed box with angle divider spreads material across the full width of the rolls to prevent uneven wear on the roll shells. Six sizes, from 16" x 16" to 55" x 30", meet volume demands.

The first Cedarapids Twin Jaw Crusher was built in 1946. In the 14 years since, aggregate producers have enjoyed the extra profits that come from the Twin Jaw's ability to step up primary crushing capacity 40% to 100% over single jaw units of comparable size.

In addition to tremendous hourly tonnages that increase overall plant production, owners of Cedarapids-developed Twin Jaw Crushers get these other benefits which assure lowest cost per ton:—

Versatility to handle many types of material, including hard or abrasive rock.

A greater percent of aggregate fractured in the primary operation (much of it crushed to finished size by the Twin Jaw) to reduce the circulating load and save wear on secondary crushers.

Extremely low maintenance, plus jaw life 5 to 8 times longer than with single jaw crushers, due to the Cedarapids design that minimizes abrasive rubbing under pressure.

There are dozens of other benefits, developed as a result of Cedarapids 14 years' experience in designing, building, and continually improving Cedarapids Twin Jaw Crushers to give you the trouble-free dependability and profitable performance that has been thoroughly proved in the field. It will pay you to send the coupon for full details. Or see your near-by Cedarapids Dealer. He can help you determine which type of crusher in the complete Cedarapids line will best suit your specific needs.

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa

Cedarapids — Built by IOWA

Gentlemen: I need higher crushing capacity with lower cost. Please send the Bulletins checked below.

- ☐ Twin Jaw Crushers
- ☐ Single Jaw Crushers
- ☐ Double Impeller Impact Breakers
- ☐ Single Impeller Impact Breakers
- ☐ Roll Crushers
- ☐ Hammermills

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ROCKY'S NOTES

by NATHAN C. ROCKWOOD

Japanese research in cement and concrete is practical

BEFORE US is the 97-page Review of the 12th General Meeting of the Japan Cement Engineering Association, May 1958. We commented briefly on the 1957 proceedings about a year ago. It evidently takes time to translate and print these in English, but the fact that the book is now two years old does not detract in any way from its interest and value to our readers. It is regrettable that this "Review" is so condensed as to provide little more than an inkling of what the papers as a whole must have contained.

As we pointed out in our previous discussion, the Japan Cement Engineering Association includes not only cement manufacturers who finance it, but engineers, college professors, researchers and others interested in portland cement and concrete. Its proceedings, in contrast to those of comparable American associations, are notably of more practical nature—these research papers are designed to develop ways and means of improving portland cement and concrete, as they are, and their use, rather than inquiries as to what cement is and how it got that way, although this is involved, too.

This small volume contains synopses, or conclusions, of 81 papers on cement, concrete and concrete products. Most of these are a page or less in length, and the English terminology is sometimes a little difficult to grasp; but as a whole, in spite of its brevity, there is a tremendous lot of useful and provocative information. We will not attempt to list all the papers and their authors, for this would take all the space allotted to us here. We shall attempt merely a general description of the nature of these papers, with such quotations as seem of practical interest and value to our readers. That hardly does justice to the contents, for we are sure we are omitting some things that would be of much interest.

The first 13 papers deal with physical and chemical properties of portland cement. Several of these deal with MgO, such as the solubility of Mg in the ferrite phase of portland cement; effect of MgO on the burning velocity of cement clinker, and the effects of MgO on the properties of the cement. From these studies, it is concluded that increases in the lattice constants may be explained by assuming that Mg→Ca substitution occurred in the crystalline structure of C_4AF to the extent of about 1 mol percent Ca atoms followed by a further substitution of Mg by Fe and Al atoms. Thus, it is presumed that the limit of solubility of Mg in C_4AF is about 1.5 percent by weight.

Other studies of the effects of MgO in the raw mix led to the conclusion that 2 percent or more, up to 6 percent, made calcination of the mix faster and at lower temperatures. Variations in the amount of free CaO through additions of MgO could not be detected; the X-ray diffraction for certain spacings of alite gradually intensified as the amount of MgO was increased. A study of the effects of MgO upon the properties of portland cement confirmed previous research.

It was determined that the uncombined MgO was least when the sintering temperature was about 1,300 deg. C., and as the temperature was raised, the combined MgO was displaced [or replaced] by presently uncombined CaO, the MgO thus being liberated. The uncombined MgO changed in accordance with variations in C_3A: C_4AF ratio. By using dolomite as a raw material, high-magnesia portland cement was made containing 25 percent of MgO. It had large expansion in the autoclave test, with cracking and disintegration, but the specimens remained stable when stored in water.

Other papers on the chemical and physical phases of cement included an X-ray analysis of pure synthetized C_3S and C_2S mixture. Series A was pure C_3S-C_2S, and series B a solid solution of C_3S-C_2S in which 1.5 mol of Ca was replaced by

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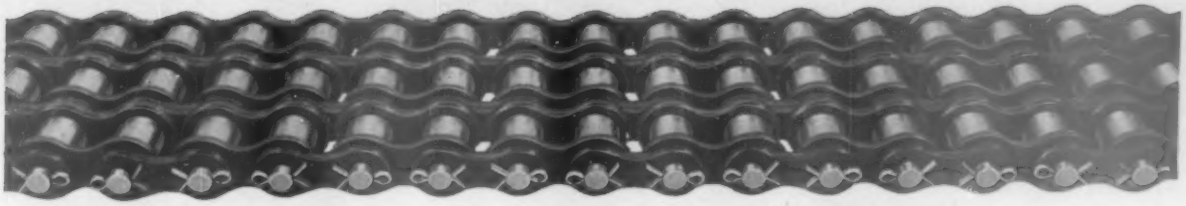


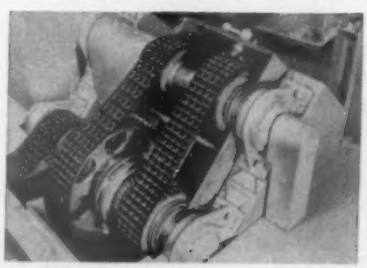
Here's
another of the
invisible extras that
insure the precision performance
of LINK-BELT roller chain

prestressing of multiple-strand chain guarantees

uniform load distribution

Unless each strand carries its full share of the load, multiple-strand roller chain may fail. That's why Link-Belt's prestressing is so vital. Prestressing seats and cold-works the chain joint parts . . . assures equal load distribution across the chain, reduced elongation in service.

Prestressing is just one of many *invisible extras* that contribute to the greater strength and endurance of Link-Belt roller chain. Others include precise heat-treat control, pitch-hole preparation, shot-peening and burnishing of rollers. These features—plus painstaking precision and inspection in every step of manufacture—assure you of chain that can easily cope with today's heavy loads and high speeds.



Quadruple-strand Link-Belt roller chain drives are used on this two-speed transmission. High speeds on short centers are easily handled.

For engineering assistance in applying industry's preferred roller chain, contact your nearest Link-Belt office or authorized stock-carrying distributor. Look under chains in the yellow pages of your local telephone directory.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,556

LINK-BELT

ROLLER CHAINS AND SPROCKETS

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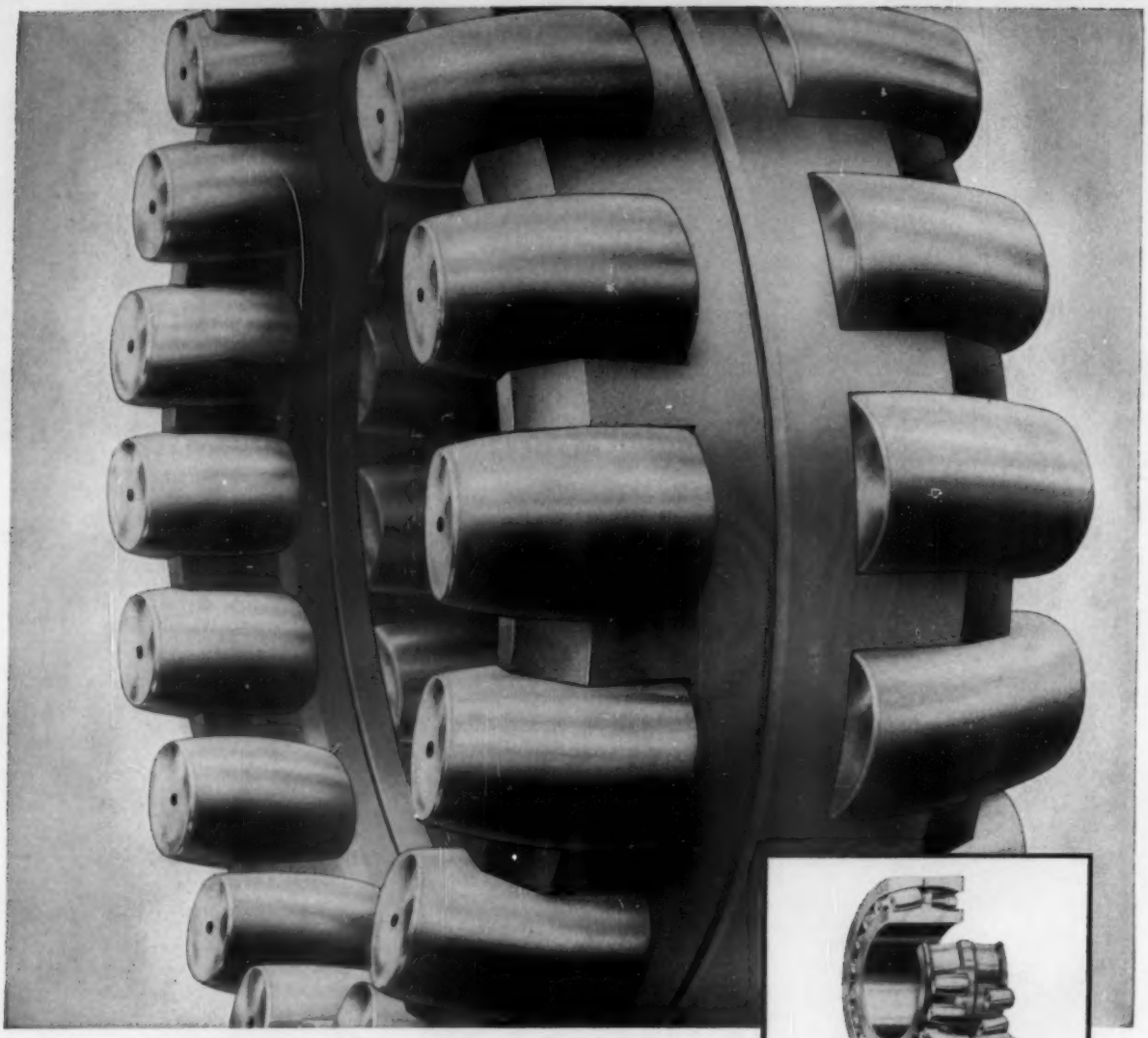

"Caged" for Longer Life!

The two land-riding cages in Torrington Spherical Roller Bearings assure proper roller spacing and guidance, even under rugged conditions of shock load and sustained high speeds. These fully machined cast bronze cages operate independently. Their design eliminates drag on rollers. These high-strength cages help bearings give longer life by providing low friction, smooth running and cool operation. Highly effective and generous lubrication of all contact surfaces is achieved with the open-end cage design.

The result: Torrington Spherical Roller Bearings are built to give extra years of unmatched service life in heavy-duty applications. Torrington's long experience in design, engineering and manufacture of every basic type of anti-friction bearing provides the finest spherical roller bearings available. You'll find it pays to standardize on Torrington.

Superior design features of TORRINGTON SPHERICAL ROLLER BEARINGS

- integral guide flange for roller stability
- asymmetrical rollers seek flange for positive guidance
- electronically matched rollers
- size-stabilized races
- fully machined land-riding bronze cages
- controlled internal clearances
- even load distribution
- inherent self-alignment
- long service life

progress through precision **TORRINGTON BEARINGS**

THE TORRINGTON COMPANY South Bend 21, Indiana • Torrington, Conn.

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WASHINGTON LETTER

by EDGAR POE

Mexico gets World Bank Road loan

A survey by the World Bank in Washington shows that the rapid growth of the Mexican economy has necessitated a big expansion of the nation's transport system, particularly of the road network. A series of road improvement programs completed or nearing completion shows that Mexico now has approximately 28,000 miles of asphalt and gravel highways. Additional expansion and improvement is essential.

The number of motor vehicles and fuel consumption has more than doubled the past 10 years. As a result, many Mexican roads are no longer adequate for the volume of traffic they carry. To help overcome these deficiencies, the government of our neighboring country has completed plans to build 8,900 additional miles by the end of 1964. The World Bank has made a $25-million loan equivalent to aid in the construction plans.

Railway Merger Proposals

Concern over the wave of merger proposals marking the railway industry is now being expressed by some higher-ups within the industry. Alfred E. Perlman, whose New York Central Railroad has often been a candidate for consolidation, has petitioned the Interstate Commerce Commission to make a full study of railroad mergers and set ground rules to replace the present case-by-case approach.

Unions abide With disclosure Law of 1959

In a report to the White House, Secretary of Labor James P. Mitchell said more than 1,400 complaints of alleged violations of the Labor-Management Reporting and Disclosure Act were investigated since the 1959 law became operative. The retiring cabinet officer advised the president: "As a result of the investigations, many instances of improper conduct have been discontinued. Where willful violations have been indicated, the evidence has been marshalled and readied for appropriate court action. By agreement with the Department of Justice, investigatory and enforcement functions have been appropriately integrated to achieve maximum results. There is, therefore, every assurance that to the extent willful violations of the law occur they will be detected, exposed and eliminated.

"I am convinced the objectives of the law are being reflected in a greater understanding, acceptance and compliance by union officers, employers and labor consultants whose behavior is being molded by the Act. I am certain, too, that the effectiveness of the Act is confirmed by constructive changes which appear only in the minutes and records and day-to-day conduct of union affairs, and by the exercise by individual union members of the rights, such as a secret ballot, which are guaranteed to them."

Fallout Shelters Proposed

The Bureau of the Budget in January was expected to carry a recommendation to Congress that it provide funds to finance installation of fallout shelters for a number of new Federal buildings over the country. The House of Representatives early in 1960 turned thumbs down on a recommendation to build shelters in some existing Federal buildings as well as in some new structures. The program would involve millions of dollars.

Explosives Act Revision

A major revision and extension of the Transportation and Explosives Act is now on the statute books. The measure, which President Eisenhower signed into law, now applies to all contract and private carriers as well as common carriers.

Added to the Act are substances which are not explosive but are dangerous if not handled properly, such as radioactive materials and live virus and bacteria shipments.

Unchanged in the final compromise version passed by Congress is the present burden of proof action. Continued ICC use of the Association of American Railroad's Bureau of Explosives in drafting regulations is permitted, but the new law also makes it clear ICC can use other groups too.

Boggs plans To re-introduce His measure

Representative Hale Boggs of Louisiana, a member of the House Ways & Means Committee, said he would re-introduce his bill designed to end censorship by taxing at the new session of Congress in January. Congress adjourned the post-convention session without taking action on the Boggs proposal which was pending on the House side of the Capitol. The Boggs proposal would correct an assertedly unfair Internal Revenue regulation. His bill would remove the existing federal tax penalty on lobbying and on advertising in connection with lobbying.

The Internal Revenue code allows as a deduction "ordinary and necessary expenses in carrying on any trade or business." Just what is included in "ordinary and necessary" business expense is frequently debated. The act specified that salaries, traveling expenses and rentals are included. Beyond that, it is a matter of argument between taxpayers and the Internal Revenue Service, and for ultimate determination by the courts. It has long been an issue whether or not contributions by businesses for political purposes can be deducted.

Compulsory Arbitration May lie ahead

Some Washington observers are worried about the drift toward compulsory arbitration in the basic industries such as steel, railroads and utilities. Some qualified observers concur that the nation was never closer to a compulsory arbitration law than during the past session of Congress. They believe the trend will be even stronger in 1961.

The No. 1 apprehension among some conservative Members of Congress is government dictation of terms of settlement in labor-management disputes. Once the government fixes wages, they say, it inevitably will fix prices.

Acceptances of compulsory arbitration would be the beginning of the end of the free enterprise system, in the opinion of some observers who have been following the labor-management affairs in the Nation's Capital for many years. If government can fix the prices, it would mean the end to the free enterprise system.

Mining by Nuclear Explosions

Congress may soon lend its support to the development of mining by use of nuclear explosions. A research and development subcommittee of the Joint Committee on Atomic Energy commended engineers for delving into nuclear mining. Mining by nuclear explosions, the committee reported, has the following possible approaches: Breaking and removal of over-burden before the mining of the ore body is undertaken; breaking of the ore in preparation for open pit mining; breaking of ore and cap rock to facilitate block caving, and breaking of ore to permit the circulation through the broken ore in order to permit the circulation of solutions through the broken ore in order to extract the valuable minerals chemically.

The committee emphasized, however, that "experimentation on barren rock which has the same physical characteristics as the ore bodies would have to be done first to avoid gambling with our natural resources."

Rogue river Basin project

The Bureau of Reclamation's feasibility report on the proposed Agate Dam and Reservoir in the Talent Division of the Rogue River Basin Reclamation Project in Oregon has been forwarded to the Congress, with the recommendation that it be authorized for construction. Commissioner Floyd E. Dominy said that construction of the earthfill dam and reservoir is feasible from an engineering standpoint and economically justified by potential benefits well above costs. The proposed construction has the enthusiastic support of potential water users in the area.

More unions Being sued By employers

More and more companies are filing suits against labor unions. Jurisprudence has been definitely established in the field. Employers are suing unions on a series of grounds including breach of contract under Section 301 of the Taft-Hartley law; damages growing out of secondary boycott and jurisdictional work stoppages; under federal anti-trust laws, and in some cases under state laws.

Cement plant Loan made

The International Finance Corporation, which in 1959 committed $1 million in the original Bio-Bio cement plant at Concepcion, Chile (designed to produce about 132,000 tons of cement annually), has made a $200,000 supplemental loan. The additional commitment will help defray extra costs incurred by the company, principally for larger foundations as a protection against earthquakes. Total cost is now estimated at $5,700,000 equivalent.

REPORT FROM WESTERN MATERIALS INC., PAMPA, TEXAS

"Our new 944 Traxcavator loads and levels nine 18-yd. trucks an hour

It gets its bucket full easier than other machines, is faster and handles better. Has plenty of reach for big trucks, too."

THAT's the word on the 944 from Craig Childers, Western's Plant Superintendent. And here's what the operator thinks about it, "I like the way it handles. It's really a fast-loading machine; and it has good balance and visibility. The idea of having the lift arms out front where you don't sit between them is great."

You can choose from three sizes in the new Traxcavator line. The 944 packs 105 HP and a 2 cu. yd. standard bucket—the big 966 at 140 HP carries a 2¾ cu. yd. standard bucket—and the 80 HP 922 has a 1¼ yd. bucket. All three mount a variety of buckets and attachments for handling various materials. And all three have what it takes to move more tons per hour and stay on the job month after month with far less maintenance.

Your Caterpillar Dealer has all the facts. Ask him to set up a Traxcavator demonstration on your job, and get a firsthand look at all the new ideas that are built into these machines. It'll be a real eye-opener.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

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OPERATOR SAFETY—Lift arms and cylinders are forward of the operator and cockpit. Visibility is excellent and access is easy... up three wide steps.

LONG REACH—With the lift arms up front, the reach at dumping height of the new Traxcavators is impressive: 57" on the 966, 51" on the 944 and 41" on the 922.

OPERATOR CONVENIENCES—Bucket controls have automatic positioners to speed every cycle; machine controls are all power boosted for easy operation. Dual brakes give operator choice of braking with or without transmission engaged.

FULL LINE OF ATTACHMENTS—Special material buckets, side dump buckets, forks, cabs, etc.

LABOR RELATIONS

A ROUNDUP OF ACTUAL DAY-TO-DAY IN-PLANT PROBLEMS AND HOW THEY WERE HANDLED BY MANAGEMENT MEN

How would you decide?

Can an employe be fired for insisting that he file a grievance before he obeys a foreman's order?

What Happened: When Frank Bruno was told to operate three machines, he protested to his supervisor. "I'm only supposed to run two machines. I've never run three of them."

The foreman replied: "Bruno, there's nothing in the contract that says you can't run three machines. Now let's get going.

But Bruno continued his argument: "You know that the union and the company have a verbal understanding that no man in this department runs three machines."

"That's a new one to me," the foreman retorted. "Now let's not waste time arguing. I've got the job to get out."

"Okay," Bruno said. "I'll work the three machines but under protest. I'll file a grievance. Then I'll come back and work."

"If you do that, you may as well go home. You'll be through here," was the foreman's answer, and he walked away.

Bruno went to get his shop steward. When he returned there was another man on the machines and the foreman told Bruno that he was fired. When the case came before a three-man arbitration board the union maintained:

1. Agreed, the foreman was right. There was no limitation, verbal or otherwise, on the number of machines. The worker was wrong in insisting that there was an "under-the-table" agreement.
2. The foreman had a right to discipline Bruno, but the penalty was too severe. The worker used poor judgment—but so did the supervisor by acting so hastily.

The company backed up the supervisor's decision. It maintained that this supervisor did what any other foreman would have done—insisted that the order be obeyed. When it was refused, he took the proper step—discharge for insubordination. The company further argued that if it allowed workers to be insubordinate, the whole structure of discipline would collapse.

Was the company:
Right? ☐ **Wrong?** ☐

What an Arbitration Board ruled: "While the foreman has the unlimited and unquestioned right to discharge or discipline, such action must be for sufficient cause. Supervisors who wish to be respected must act with reason. When a man's job is involved—when a company's investment in an employe is about to be lost—when future relationship between a management and its employes is at stake, a supervisor is dealing with a very serious matter. He must realize that there are degrees of disobedience. A man may quietly say that he doesn't think he should follow an instruction because of an agreement violation; he may become abusive or he may engage in open conflict with his supervisor. Each action may be classified as insubordination. But there is a difference. There was certainly a better way to settle this problem than through discharge. This was too severe. A two-week layoff without pay is sufficient.

Should an employe be disciplined for violating the law?

What Happened: Walter Davis drove a truck. One morning while Davis was maneuvering a "ten-wheeler" down a rough road, it began to rain heavily. He decided that, because the right side of the road was deeply pitted, he would take his vehicle on the left side. There was no traffic in sight either way. However, on the left side there was a canal. In any event, Davis began to drive on the left side. The road collapsed and the truck plunged into the water Davis climbed out, unhurt.

Upon investigation the employer decided that Davis had been guilty on 2 counts: one was gross negligence and the other was disobedience of a law, for it is illegal to drive on the left side. He was discharged.

Davis argued in his own defense:

1. I was not guilty of gross negligence. What happened was an accident. I used my judgment and it turned out bad.

2. Yes, I did violate the law. But that is not the employer's business. That's up to the state authorities.

The employer came back: Davis was an experienced driver. He knew that he should not disobey the law. By doing so he caused serious damage to our equipment. We consider that to be gross negligence.

Was Davis:
Right? ☐ **Wrong?** ☐

What Arbitrator Bonebroke ruled: "Driving on the left side of the road unquestionably is contrary to state traffic laws, but the mere infraction of such a law does not permit an employer in a contract such as this to necessarily exercise discharge. Willfulness on the part of Walter Davis does not appear. Whether or not he acted reasonably, his conduct is not shown to be willful—that is, in a headstrong manner and in disregard of the consequences. The occurrence, in the Arbitrator's mind, was an unfortunate accident—one that might have happened to anyone. It did not, in my opinion, justify discharge for proper cause. The employe is to be offered full reinstatement."

(Continued on page 32)

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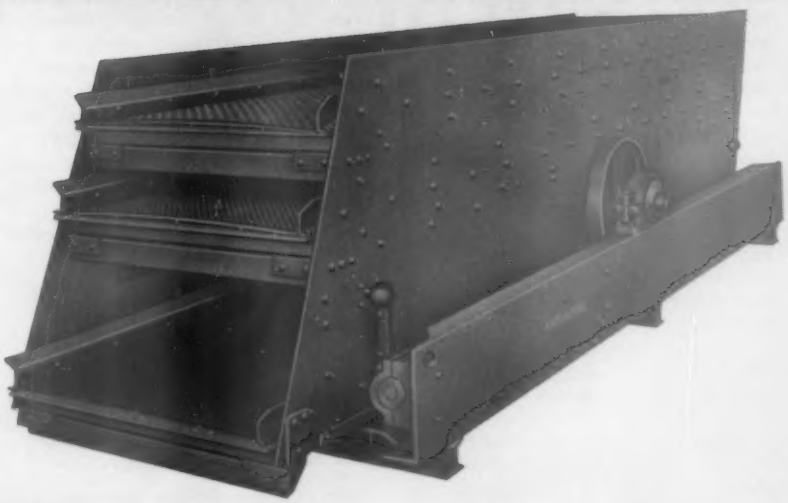

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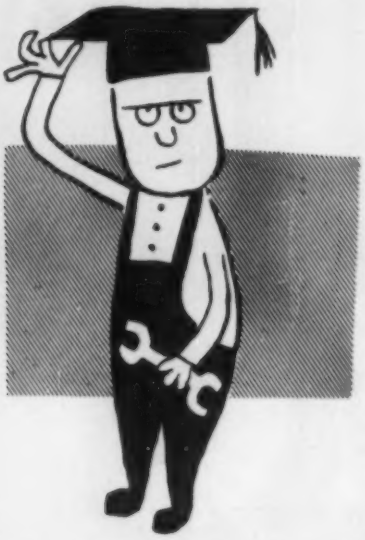
continued from page 28



Can you discharge a militant union official for telling a "few white lies" on his employment application?

What Happened: During a coffee break, Roland Manto, the personnel director, sat down next to an employe, John Warner—a union officer. They chatted for about 10 minutes. When the personnel man returned to his office, he said to one of his aides: "I wonder why this fellow Warner is working as a production man. He has an excellent vocabulary, seems very well educated and has a lot of self confidence. Let's take a look into his background."

A check revealed some startling facts: Warner was a college graduate, had been fired twice in prior jobs—once for insubordination and the other time for falsifying his employment application. Three companies he listed as places of employment did not exist. The fact that he had been discharged twice did not appear on his employment application.

When confronted with this evidence, Warner declared that he had lied because he felt he wouldn't get the job on the basis of his past record. He had found that being a college graduate was a handicap in getting a job as a production worker. He was interested in unions and took hourly-paid jobs so that he could foster that interest. He pointed out that his work had been good and that a year had passed before the company investigated his employment application. Nevertheless the company fired him.

Warner charged that if he had not been a strong union officer, he would not have been fired.

The company called Warner a "pathological liar and a fraud." His omissions on his application were not "little white lies." The truth would have kept the company from hiring him. The fact that he was a union man was coincidental. This should give him no special immunity. The company has been dealing with unions for years and does not make it a practice to discriminate. As for the year's wait, the company maintained that time does not give an employe immunity where this kind of falsification is concerned. In fact, the hiring application had the following paragraph:

"Applicant will please read carefully before signing: Should you be employed, any false statement discovered in this registration will be considered cause for dismissal.

Signed .....Applicant"

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Wolff ruled: "John Warner falsified his employment application not only as to educational background, but also as to former employment—the number and duration of jobs he had held and the work he had done. He did this for the purpose of obtaining employment which he believed he would not get if the true facts were shown. He signed this with the warning on the application that discovery of any false statement would be cause for dismissal. It is true that at the time of his dismissal he was a union official and appeared militant and aggressive. Whether or not he was a union official, his falsification supports discharge for the impropriety of what he did. The company was justified in his dismissal."

Can management assign a "rush job" to non-union employes?

What Happened: The company had agreed to a policy which read, in part: "supervisors, foremen and others outside of the bargaining unit shall not perform work normally performed by employes in the bargaining unit except for purpose of instruction and tryout of tools and equipment, or in cases of extreme emergencies necessary to the proper function of the plant."

When an important customer called and said he was returning a defective shipment, the management promised to repair the units immediately. A crew of workers was quickly assigned to put the products in good order. The supervisor figured that the job would be finished by the end of the shift and didn't assign any employes to overtime. He was called to a management meeting. When he returned he found that the men, having completed their shift, had already left—and the job was still not finished. He immediately got hold of a group of junior engineers. With their help, he completed the repair of the units, packed and shipped them back to the customer.

The next day the employes filed for overtime pay because they claimed that they should have been assigned to that overtime work. The company refused and argued:

1. We had an extreme emergency on our hands and had a right to assign the completion of this job outside the bargaining unit.
2. We made a mistake in estimating the time for the job incorrectly. But we had an unhappy customer on our hands and had to act immediately.

The employes were not impressed. They said:

1. This was not an "extreme emergency." If it was, the supervisor wouldn't have left to go to a meeting.
2. We could have been called back to do the job.
3. If management miscalculated time for the job, we shouldn't be made to suffer a pay loss.

Were the employes:
Right? ☐ **Wrong?** ☐

What Arbitrator McCormick ruled: "The company was faced with a serious problem. Failure to ship the goods would displease the customer and might lead to the loss of the account. In order to solve the problem, employes outside the bargaining unit were put to work. The supervisor, on whom the ultimate responsibility rested, did not follow through by having somebody check the progress of the work from time to time, and he did not learn until very late that the work was not completed. It would seem that the company could have known, by adequate supervision, that the work would not be complete by quitting time. The employes who should have done the work shall be paid the amounts they would have received if they had worked to complete the job."

END

RAYMOND BOWL MILLS

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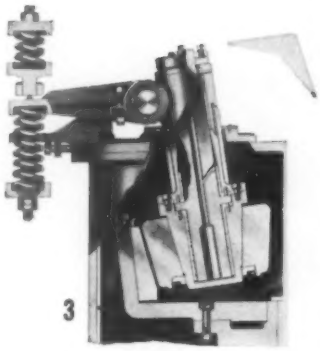

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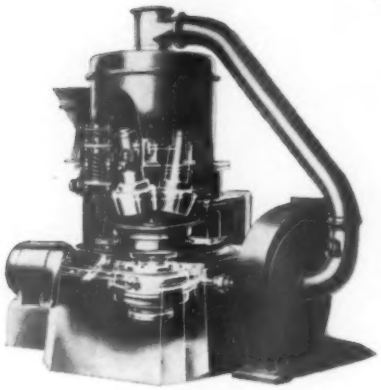

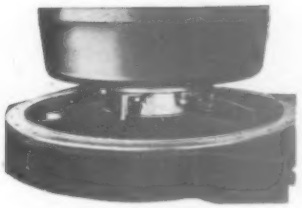

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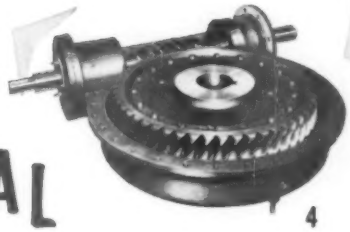

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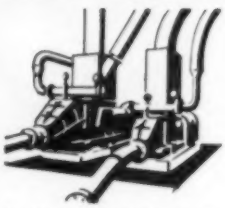

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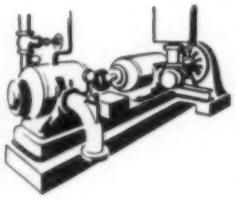
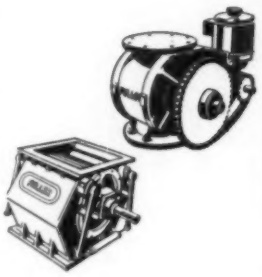
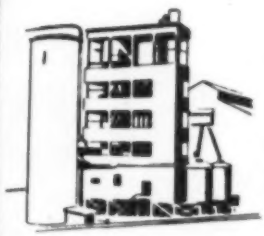


Fuller Rotary Compressors and Vacuum Pumps are vibration-free, can be installed anywhere, even on balconies. Fewer moving parts mean minimum maintenance. Compressors and Vacuum Pumps handle air and gases from 30 to 3300 cfm at pressures to 125 lb. gage. Vacuums to 29.95 in. (referred to 30-in. barometer).

Fuller Vane-type and Roll Feeders . . . for volumetrically controlled feeding of a wide range of dry pulverized or granular materials. Also Fuller Rotary Valves . . . used under silo deck slabs and bins to permit the free flow of pulverized materials which tend to arch, such as lime and cement raw materials.





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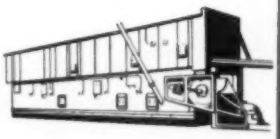

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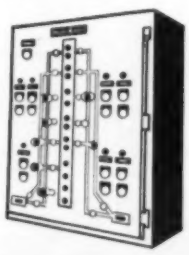

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PEOPLE IN THE NEWS

B. C. Cement appoints production vice president

R. E. HASKINS has been appointed vice president of production and a member of the board of directors of the British Columbia Cement Co. Ltd., Vancouver, B. C. A graduate of the University of British Columbia, Mr. Haskins joined the company in 1945 and has been serving as superintendent of the Bamberton plant.

Four promotions at Riverside Cement

JOHN H. ASMANN has been promoted from vice president and treasurer of American Cement Corp. to comptroller of the Riverside Cement Division, Los Angeles, Calif. Mr. Asmann joined Riverside in 1943 as assistant comptroller and in three years advanced to comptroller. He remained at Riverside until 1957 when he was appointed vice president and treasurer of American Cement Corp. in Philadelphia, Pennsylvania.

Another advancement takes Robert L. Lambert from Riverside Div. comptroller to treasurer. He has been with the company since 1955, when he served as staff accountant. A year later he was appointed assistant comptroller and in 1957 became comptroller of Riverside.

Robert E. Hyche has been elevated from manager of administrative services at Riverside to marketing manager for the new white cement plant under construction in Crestmore. Mr. Hyche started with Riverside in 1955 as assistant to the vice president and treasurer and in 1960 became manager of administrative services.

Stanley L. Timmins has been promoted from assistant to the general sales manager of Riverside to sales manager of the company's sack products. He started in 1952 as a clerk in the service order department and two years later became a salesman, advancing to assistant to the general sales manager in 1959.

Columbia-Southern assigns personnel

WILLIAM T. NEWMAN has been appointed technical service engineer of Columbia-Southern Chemical Corp., Pittsburgh, Pa. Formerly associated with the Barberton, Ohio, cement plant, Mr. Newman joined the company in 1956 following graduation from the University of Minnesota.

Fred P. Ewald, Jr., a graduate of Aquinas College, has joined the Barberton research center as a senior research chemist, while James E. Wyche III, a graduate of Louisiana Polytechnic Institute with a BS degree in chemical engineering and an MS degree from the University of Texas, has been named chemical engineer at the Lake Charles, La., plant.

David E. Lynn, who has been associated with the cement industry in the Cleveland area for the past five years, has been appointed a sales representative in northern Ohio for the Columbia Cement Corp., a wholly owned subsidiary of Columbia-Southern. Mr. Lynn attended Kent State University and Fenn College in Cleveland, Ohio, where he majored in business administration.

Huron Cement names Jolly Alpena superintendent

JOHN W. JOLLY has been named general superintendent of the Alpena, Mich., plant of Huron Portland Cement Co., Detroit, Mich. He succeeds Elmer H. Evans who has been appointed superintendent of construction. A native of Oak Park, Ill., Mr. Jolly is a graduate of the University of Illinois with a BS degree in commerce. For the past year he has been serving as the assistant to the mill manager.

IMCC official joins Yale and Towne

A. CLIFFORD THORNTON, formerly director of personnel and industrial relations of the International Minerals & Chemical Corp., Skokie, Ill., has been elected to the newly created position of vice president-personnel of The Yale & Towne Mfg. Co., New York, N.Y.

Born in San Marcos, Texas, Mr. Thornton attended the University of Texas and joined IMCC in 1943 as personnel and safety supervisor. He was advanced to industrial relations manager in 1945, and became director of personnel and industrial relations in 1956.

(Continued on page 40)

NEW 631 420 HP (335 HP flywheel) . . . 31.2 MPH . . . 28 cu. yd. (21 cu. yd. struck).

NEW 630 420 HP (335 HP flywheel) . . . 41.5 MPH . . . 630A Tractor-Scraper . . . 28 cu. yd. (21 cu. yd. struck). 630-482C Tractor-Scraper . . . 35 cu. yd. (27 cu. yd. struck).

NEW ATHEY ROCK WAGONS
38 ton PR630 and PR631 built by Athey Products Corporation.

BIG! POWERFUL! NEW CAT 630 AND 631

MATCH POWER TO JOB CONDITIONS—AUTOMATICALLY!

A new concept in power shift transmission coupled with a new 420 HP engine . . . plus other proven new developments . . . provides the last word in operating, service, maintenance ease and economy. The four-wheel 630 and two-wheel 631 join the widely accepted DW20, DW21 and 619 to give you an even broader choice of hauling units from Caterpillar.

The new transmission and new engine on the 630 and 631 are designed and teamed to fit power to working conditions. This tailored power train, together with unit construction, greater scraper and wagon capacity, air-actuated cable control and new tires, makes the 630 and 631 the ultimate in hauling equipment design! Some of the features are described here. For complete proof of performance, ask your Caterpillar Dealer!

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

ADVANCED AS TOMORROW —CERTAIN AS YESTERDAY

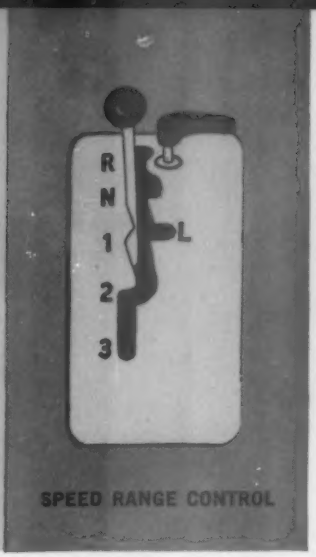
NEW 29.5 x 35 TIRES
This all-new tire size was originally developed for the 630 and 631, to provide the best combination of size, capacity and rideability at lowest cost per yard. These tires were proven by exhaustive laboratory and field tests.

NEW SCRAPERS
Matching 28 cu. yd. heaped (21 cu. yd. struck) scrapers feature increased capacity, better loading. Sheave bearings now have 125-hour lubrication period. Other matching trailed units are also available.

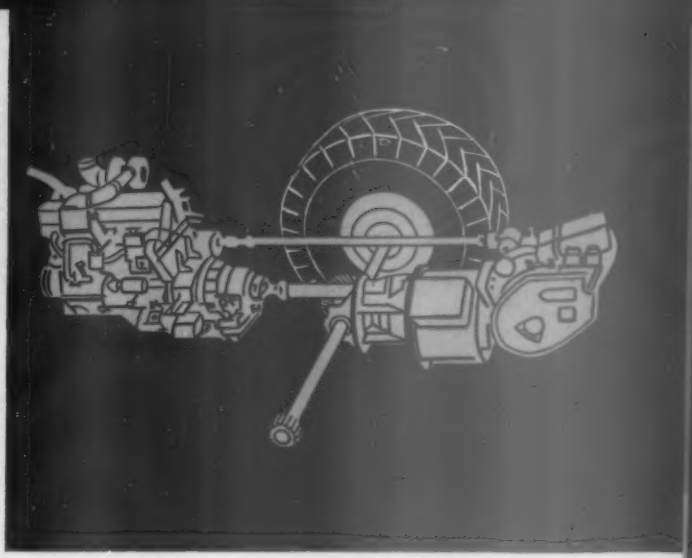
NEW CABLE CONTROL
Live power provides control whenever the engine is running. Air-actuated controls cut operator effort in half, yet retain "feel" of the control. New cable savers prevent breakage due to double-blocking.

IMPROVED STEERING
New two-jack steering makes the 631 easy to maneuver, yet retains "feel" of the road. Improved steering for the 630 absorbs shocks outside of the steering gear, provides easier handling in tight quarters.

SHIFT INDICATOR



SPEED RANGE CONTROL



3 SHIFTS—9 SPEEDS

POWER SHIFT TRANSMISSION. This new concept in power shift transmission automatically adjusts the 630 and 631 to job conditions. Key to this system is the torque divider transmission mounted directly behind the engine, which combines planetary gears with a torque converter so as to provide power to the three-speed-range transmission in one of three ways: (a) torque divider drive (a combination of 75% direct, 25% torque converter); (b) direct drive; (c) overdrive. Result: nine different speed variations—*but* the operator need only concern himself with the three speed ranges and load range controlled by one lever. (A safety latch prevents accidental engagement.) The rest is completely automatic, governed by a mechanical-hydraulic system. Here's how it works:

Operator moves lever into *1*, first range, to start machine down haul road. The machine is now in torque divider drive for easy start and greatest rimpull. As speed increases, converter is no longer required, so the transmission shifts *automatically* to direct drive. When conditions permit, it automatically shifts to overdrive. As speed increases, the shift indicator dial shows operator when to shift to second speed range, *2*. Again the transmission automatically goes into torque divider drive. As before, when conditions permit, it automatically shifts to direct drive and then to overdrive. This same cycle can be repeated in third range.

NEW 420 HP ENGINE AND MATCHED POWER TRAIN

Downshifting is automatic, too. As transmission senses increasing power needs, it shifts down from overdrive to direct drive to torque divider drive. When conditions require it, the indicator tells the operator when to select the next lower speed range. Once back in the cut, operator shifts to load position, *L*. This locks the transmission in torque divider drive of the first speed range.

ALL-NEW CAT ENGINE. Designed specifically for the 630 and 631, this six-cylinder, 5.4″ bore x 6.5″ stroke D343 engine is turbocharged and aftercooled. It develops 420 HP maximum (335 HP at the flywheel).

Typical of the newness is head design. The engine is parallel ported with dual intake and exhaust valves for most efficient air system. Overhead camshafts eliminate rocker arms and push rods. New shelf head design results in fast coolant circulation for outstanding heat dissipation.

In addition to these and other new features, the engine offers . . . the economies of the proven Cat fuel system with precombustion chamber (burns No. 2 fuel oil—premium diesel fuel not required) . . . pressure ratio controlled turbocharger for optimum air flow throughout the engine operating range . . . aftercooler for greater air density for more complete combustion.

FULL UNIT CONSTRUCTION—EASIER SERVICING

TRANSMISSION UNITS

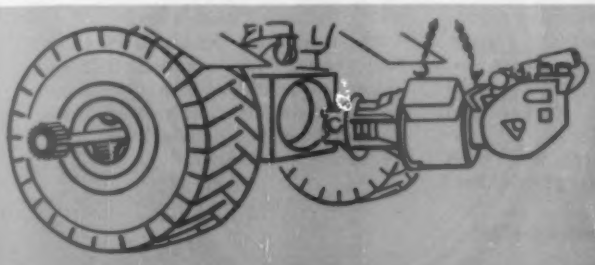
Range transmission is case mounted for accessibility, can be removed as a unit with cable control and differential carrier. Another timesaver: torque divider transmission is removable as a unit without disturbing the engine. Transmission control units are accessible without disturbing the transmission.

NEW RADIATOR-FAN UNIT

Fan is mounted on the radiator for more efficient cooling. Now radiator, side plates and fan can be removed as a unit for servicing—or to provide easy access to the front of the engine.

SERVICING TIMESAVERS

Dash swings away to expose entire left side of 631's engine. Crankcase guard pivots down for easy access to the bottom of the engine. For easy tire removal, rear fenders tip forward on the 630, and are easily removable on the 631.



continued from page 37

Ideal elects Price and Saulsberry vice presidents

F. N. PRICE (left), industrial relations director, has been named vice president in charge of industrial relations for Ideal Cement Co., Denver, Colo. He joined the company in 1947 as labor relations manager and was named director of the industrial relations department in 1956.

E. F. Saulsberry (right), who has been general purchasing agent, has been named vice president in charge of purchasing. He joined Ideal in 1927.

Industrial relations director for Lake Ontario Cement

JAMES PETER CONNELL has been appointed director of industrial relations of Lake Ontario Portland Cement Co. Ltd., Toronto, Canada. A native of Halifax, Nova Scotia, Mr. Connell attended Acadia University. He was formerly manager of industrial relations of the chemicals and plastics division of Union Carbide Canada Ltd. and previously served as manager of industrial relations of the Bakelite division in Belleville, Ont.

NMWA elects president

F. E. DUTCHER, vice president of the Johns-Manville Sales Corp., New York, N.Y., has been elected president of the National Mineral Wool Association. He succeeds M. M. Wilson, vice president of Baldwin-Ehret-Hill, Inc., Trenton, N.J.

On NSC committee

LEONARD R. FLICKER, director of safety for Permanente Cement Co., Oakland, Calif., has been elected to serve on the Membership Committee of the Cement & Quarry Section of the National Safety Council.

Vice presidents named by Drummond Dolomite

R. L. MILLER has been elected vice president of plant operations for Drummond Dolomite, Inc., Sheboygan, Wis. M. F. Kummer has been named vice president of industrial relations, and J. P. Feick, vice president of marketing.

Material Service names assistant

JAMES T. RYAN has been appointed assistant director of industrial relations for Material Service, division of General Dynamics Corp., Chicago, Ill. Mr. Ryan, a graduate of De Paul University, has an extensive background in employe relations and the administration of personnel programs.

Hendrickson and Kennett promoted at Arizona Cement

VERNON E. HENDRICKSON has been named superintendent of the Rillito, Ariz., plant of Arizona Portland Cement Co., Los Angeles, Calif., succeeding Fred A. Kennett who has been promoted to assistant production manager for the Arizona and California plants.

Mr. Hendrickson is a native of Colton, Calif., and attended Valley College at San Bernardino. He joined Arizona Portland Cement Co. in 1941, moved to the Rillito plant in 1954 and became plant superintendent.

Mr. Kennett has been with the Rillito plant since its construction.

Wakely heads two companies

JAMES T. WAKELY, formerly executive vice president, has been appointed president of the Iron City Sand & Gravel Corp., Pittsburgh, Pa., and the Vang Ready Mixed Concrete Co. He is a native of Springfield, Ohio.

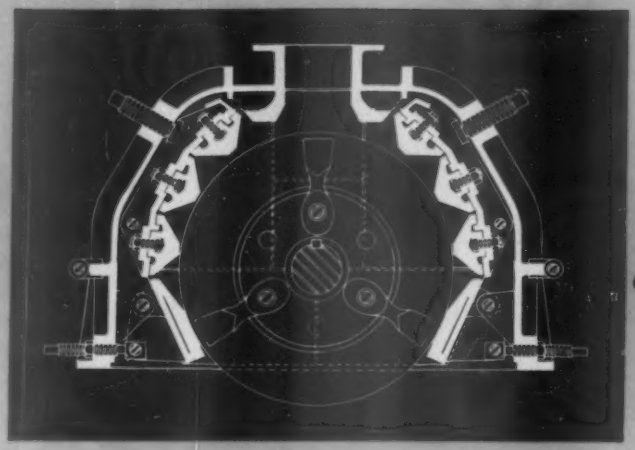
Portland Cement Assn. district engineers

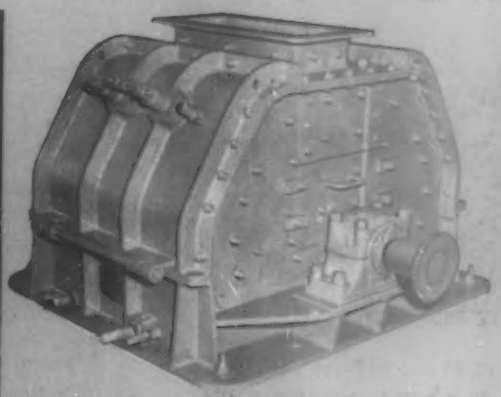
ROBERT H. LOCHOW (left) has been named to succeed Albert L. Blackwell as New Jersey district engineer for the Portland Cement Association. Charles H. Knight, Jr. (right), succeeds Mr. Lochow as district engineer for the states of Washington, Oregon and northern Idaho.

Mr. Lochow has been with PCA since 1949, serving as general field engineer and then paving engineer for the Seattle district. He is a graduate of the University of Washington.

Mr. Knight has been with PCA for four years serving as general field engineer and as district conservation engineer for the Los Angeles area. He is a graduate of California Institute of Technology, Pasadena.

END





● Pennsylvania CD Series Reversible Impactor with adjustable upper and lower breaker blocks.

WHY PENNSYLVANIA REVERSIBLE IMPACTORS HELP YOU LOWER YOUR REDUCTION COSTS

The Pennsylvania-pioneered reversible impactor is known throughout the industry for its amazing economy. Here's why.

1. "Free air" impact crushing, with elimination of attrition, means lower reduction costs. Material drops through centrally located feed chute, penetrates deep into path of beaters, is struck, shattered, driven against massive anvils, and is again struck by rotating beaters.

2. Low power requirements, because of large working clearances. There are no cage bars or screens in an impactor. Feeds get through quickly. More product per hour.

3. Push-button reversal. Rotor can be reversed and new sets of hammer faces and breaker blocks are provided on the other side of the mill. No time out or manual hammer turning. Identical product in either direction.

4. Adjustable breaker blocks. As wear occurs, simply move blocks toward hammer circle . . . more constant tonnage, uniform product, more tons crushed per set of hammers.

FREE BULLETIN

Because of the wide range of application, Pennsylvania Reversible Impactors are made in a number of types. For complete description of all types write for Bulletin 6018.

PENNSYLVANIA CRUSHER DIVISION
BATH IRON WORKS CORPORATION
WEST CHESTER, PENNA.

★ ★ ★

Over 50 years' concentrated experience in all types of material reduction makes Pennsylvania your best source of crushers and engineering advice and service. Call on Pennsylvania with your next crushing problem. Representatives from coast-to-coast.

PENNSYLVANIA CRUSHERS

BATH-BUILT

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ONLY LOADER WITH .

You shift from any one gear to any other—forward or reverse . . . on-the-go. Allis-Chalmers tractor loaders make fast work far easier for any operator.

It's simple for a tractor loader operator to work faster—get more done. It's just as easy for him to go into a high gear as into a low gear—forward or reverse. ONE LEVER controls both speed and direction. No fumbling around with two or more levers or a combination of levers and foot pedals.

Besides operating simplicity, a tractor loader has *firmly connected axles*—attached to frame with 2-inch diameter steel pins . . . no rolling and shifting under load. *Extra stability* lets operators get and deliver

move ahead with

. SINGLE-LEVER SHIFT

bigger loads with greater comfort. Add *extra reach* for fast, even dumping and you can see why production is higher with an Allis-Chalmers tractor loader. Let your dealer show you. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

The "Big Three" tractor loaders range in size from the TL-14 with 5,300-lb carry capacity to the TL-20 (shown) with 9,000-lb carry. Each has a family of buckets—18 bucket loader combinations in all.

Now available in Persian Orange or Allis-Chalmers Yellow at no extra cost.

ALLIS-CHALMERS

. . . power for a growing world

FACES & PLACES

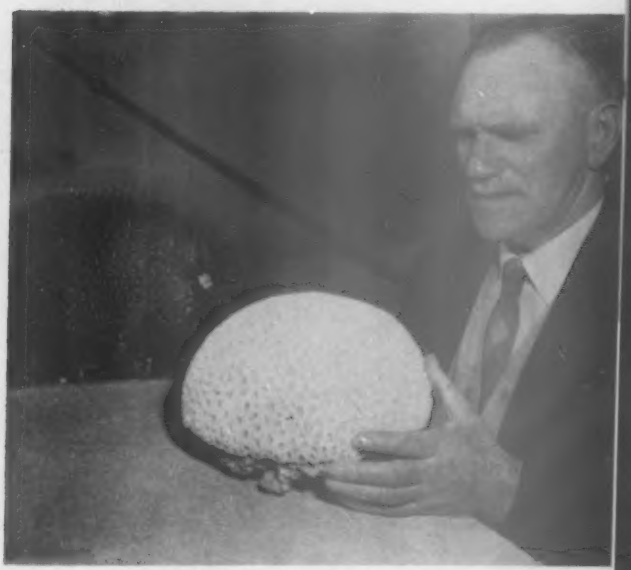
CANDID SHOTS OF PEOPLE IN THE ROCK PRODUCTS INDUSTRY

LEFT: NOW THAT THE $25-MILLION PLANT has been completed for the Dundee Cement Co., Dundee, Mich., its modern and efficient facilities produce a record capacity of 6 million barrels annually. Here shown inspecting the plant are Dr. H. A. Gygi (left), president, and R. B. Martin, vice president and general manager of the company

ABOVE: "THIS IS THE WAY WE INSTALLED the cement coolers," explains C. W. Fox, operations manager of Phoenix Cement Co. Mill building of this company's Clarkdale, Ariz., plant was designed after a scale model where installation bottlenecks could be anticipated. Result—exceptional compactness, yet there's working space left to add more machinery

RIGHT: WAY, WAY DOWN, ½ mile below the earth's surface, officials of Columbia-Southern Chemical Corp. and its subsidiary, Columbia Cement Corp., examine raw material during the orientation tour of Columbia-Southern's limestone mine at Barberton, Ohio. R. E. Widing (right), C-S assistant works manager, discusses use of limestone in cement production with K. L. Rothermund, Jr., sales manager (left), and W. B. Sippey (center), vice president, sales, both of Columbia Cement. The tour was one phase of the orientation program designed to acquaint the company's cement representatives with raw materials and cement production operations during the conference

LEFT: GRADUATES of industrial instrumentation course at Leeds & Northrup's training center in Philadelphia were D. Alderman (left), shift foreman at Milwaukee, and M. Shetter, repair foreman at Nashville. The cement men are shown examining some instruments L & N manufactures



ABOVE: CORAL MEANS CEMENT because a cement factory, built near the Brisbane River, Australia, uses coral as the major component. The factory's fleet of three vessels collects 600,000 tons of coral every year. A staff of 40 works in the maritime operations. Here, Capt. J. W. Day, marine superintendent, examines the type of coral used for making cement; in background is a piece of uncleaned coral

LEFT: THESE IDEAS WON cash prizes totaling $750 for five senior students of architecture at the University of Virginia. The contest was the seventh annual "Solite Competition Award." J. H. Verkerke and W. M. Walsh, Jr., tied for first place; E. L. Gray, Jr., and H. C. Johnson, Jr., were second; W. W. Wood, Jr., won third. These students competed in the design of an exhibition building for Waynesboro, Va. The building is to be used as a display center for the arts, crafts and industries of the Shenandoah Valley. The competition is sponsored annually by the Solite Corp.

INDUSTRY NEWS

Russians observe and buy equipment in England

QUARRY FIELD TRIALS of a new drilling machine of novel design were observed by Russian engineers in England. This was the first of 15 similar tracked tower drill rigs ordered by the Soviet Union.

Mounted on electrically driven tracks, the tower attains a gradient of 1 in 7. It is intended for use by the Russians in roof scaling, roof bolting, drilling and general mine roof inspection purposes for heights up to 90 ft.

This mobile machine is an innovation in that four drifters, using medium weight drills mounted on power feed cradles, can be operated simultaneously by two men.

Four holes can be drilled at the same time to a depth of 13 ft. Russian requirements will vary from horizontal to slightly dipping, to those angled up to 30 deg.

The rig is stable under difficult drilling conditions—that is, when the platform and the hydraulic booms are in the highest position, with the drifters spread out to their full width of 24 ft. and the tracks on a gradient of 1 in 10.

Essentially a hydraulically operated tower, the machine is composed of five telescopic sections mounted on an electrically powered chasis. When fully extended the tower platform attains a maximum height of 81 ft. and carries a safe working load of 660 lb. For travelling purposes, the tower can be retracted and then pivoted through 90 deg. to rest on a sub-frame attached to the chasis. This results in a minimum over-all height of 11 ft. 3 in., enabling freedom of movement under relatively low headroom conditions.

Restrictor valves are an interesting feature of the machine's ram hydraulic circuit. These come into operation in the event of pipe damage, ensuring that the tower descends at a relatively slow and safe rate.

Asbestos development in Newfoundland

AN ASBESTOS ORE BODY in northern Newfoundland will soon be developed by an investment group. Located in the Baie Verte region of the Burlington Peninsula, the deposit is of the chrysotile type. Most of it is high quality grade 4 long fiber.

Proven reserves to date in the sections explored, tested and core drilled are estimated at 22 million tons. Considerable investigation is yet to be made on the remainder of the property. Tests in the area covered also indicate the presence of non-ferrous metals in an undetermined quantity. Core drilling will be continued to determine the amount, quality of ore.

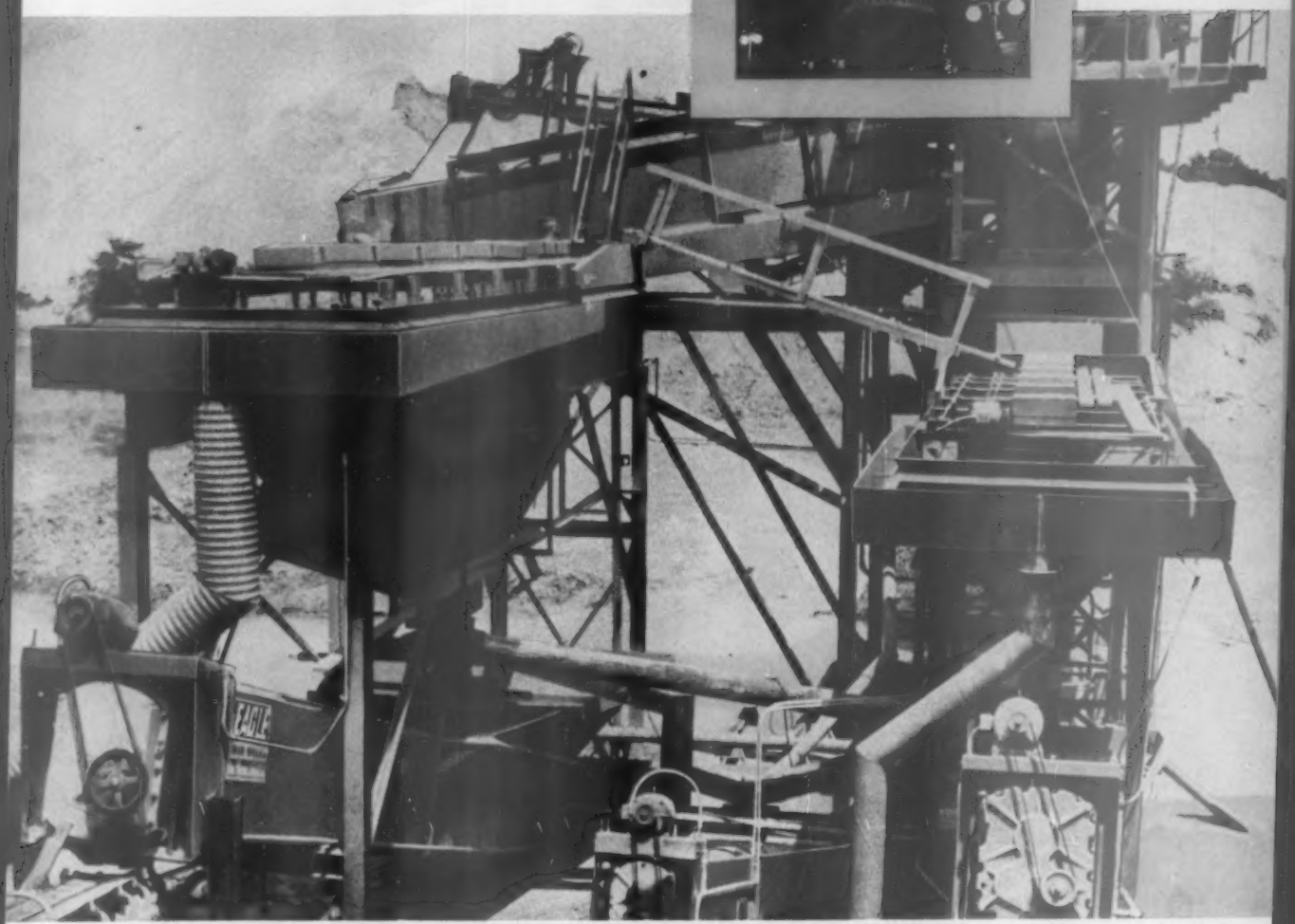
Those developing Baie Verte are Canadian Johns Manville Co., Ltd.; Patino of Canada; Amet Corp., Inc. and Financiere Belge de L'Asbest-Ciment, S.A. The total subscription is $18 million. These companies have agreed to purchase, at market prices, varying amounts of the fiber.

To be constructed at the mine site are a mill, a crushing building, dry rock storage, a warehouse and a service structure. Roadway and a dock will also be built, providing loading facilities.

(Continued on page 50)

Enter 1012 on Reader Card

Eagle Equipment helps on U.S. Capitol "face lifting" job!



"We Are Readily Meeting Federal Specs"

Says C. E. Reithmeyer, Jr., Supt., Forestville Sand & Gravel Co., Inc., Upper Marlboro. Md.

Forestville Sand & Gravel Co., Inc., readily meets aggregate specifications with their Eagle Sand Washing-Classifying-Dehydrating Section and their Eagle Log Washer. The sand section is producing a high quality concrete sand and the log is processing gravel from ⅜" to 1½".

Most of the material produced is going into concrete for three vital projects in Washington, D.C.—the expansion work and new front on the Capitol, the new House of Representatives Office Building and the new 12th Street Expressway.

C. E. Reithmeyer, Jr., Supt. of Forestville Sand & Gravel Co., shown at right, reports that they have no trouble meeting federal specifications as well as State of Maryland specifications. He states that the Eagle equipment is smooth running and also requires a minimum of attention.

Several years ago Forestville installed an Eagle single screw Washer-Classifier-Dehydrator and 16′ Water Scalping-Classifying Tank, which was later extended to 24′ to meet increasing capacity demands. A 24′ length log washer was added when plastic clays were found in the deposit. Based on successful, economical performance they recently added a 32′ Water Scalping-Classifying Tank and two more single screw units.

Eagle Equipment has served many producers well and long—as a result Eagle has a large storehouse of valuable experience upon which producers everywhere can draw. If your profit picture isn't what it should be it will pay you to look to Eagle. Send for Catalog.

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EAGLE IRON WORKS

Factory-Trained Distributors Everywhere

EAGLE IRON WORKS

ENGINEERS • MANUFACTURERS

137 HOLCOMB AVE., DES MOINES, IOWA

4½ yds, 262 hp provide new approach to basic quarry production problems

One machine replaces

The scene is Mississippi Lime Company's stone plant and quarry near Alton, Illinois. The machine is a Michigan Model 275A Tractor Shovel, with 22,000 lb lift capacity, 4½ yd bucket, 262 hp. Working both above *and* below ground, *it alone is doing the work of two swing shovels and two dozers.* The company's superintendent of operations explains some of the Michigan's assignments . . .

Charges pug mill: 4,000 tons per day

Originally the pug mill was charged by two swing shovels and two crawler dozers (228 hp on tracks and 218 hp on rubber). Pushing stone out of stockpile to the swing shovels was slow, inefficient, took two to three hours overtime to achieve 4,000 ton per day production. A test was arranged in the hope that the Michigan's speed and 4½ yd bucket capacity could take over.

It did—and how!

The 262 hp Michigan Tractor Shovel today does the whole job alone in 8 hours, *without overtime.* Dozing is no longer necessary; the Michigan, with its 12′11″ clearance under bucket hinge, feeds direct into elevated hoppers.

Does work of two swing shovels truckloading stockpiled stone

Other times, the Michigan handles truck-loading of stockpiled stone. Typical 18 yd semis are heaped in 4 passes, 2 minutes. Time is less than one-third that required by either of the two 1½ yd electric swing shovels formerly used for this operation.

About the only job left for the swing shovels, in fact, is loading out shot rock in the quarry. And the Tractor Shovel *can* handle this task. When it does, the costly operation of dozer cleanup is eliminated too.

Piling shot rock for loading, Michigan lifts and pushes material higher than could dozers previously used.

Typical load for Mississippi Lime's Michigan: 4½ yds of 2700 lb material. Note the two 1½ yd shovels, sidelined since the big Michigan took over this pug mill feeding job.

High dumping clearance, 12' 11", makes pug mill charging an easy job. Michigan feeds 4,000 tons of crushed limestone every 8 hours, has time to spare for other production jobs.

the four "normally" needed

Piles, cleans shot rock in underground quarry

By speeding these regular production jobs, Supt. E. M. Sipprelle finds the Model 275A has time for additional chores around the 250 acre plant area *and in the 35 acre underground quarry*. For example, a dozer was formerly used underground to push up shots. But the versatile Tractor Shovel piles stone higher—making loading out by swing shovels or the Michigan more efficient.

After loading, the 50 ft wide by 22 ft high quarry headings must be cleaned before the jumbo drill rigs can re-enter. The 28 mph Michigan runs over from stockpile or pug mill, cleans up, and is back on its original job in 35 minutes or less. Time spent *on the cleanup work alone* is less than half that formerly required by the crawler.

To all these production advantages, the Michigan has the added advantage of *greatly reduced maintenance*. Equipped with abrasion-resistant wide-base rock tires, all problems of costly track wear and repair have been eliminated.

Buckets to 12 yds

We'd like to show you first-hand how a Michigan Tractor Shovel's power, speed and versatility can pay off on your job. Choose from nine models, with lifting capacities ranging from 2,900 to 29,000 lbs, then give us a call. We'll be glad to arrange a demonstration—at no cost to you and no obligation!

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK EQUIPMENT

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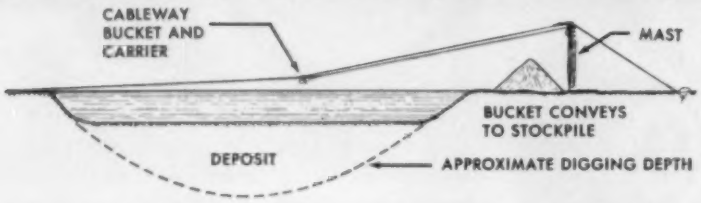
Benton Harbor 44, Michigan

In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario

The Best Method for Digging Under Water is a Sauerman Slackline Cableway

. . . R. W. Bisett, Pres., Olean Gravel, Inc.



A Sauerman Slackline Cableway has been excavating material for Olean Gravel, Inc. since 1930. The 1½-yd. bucket has an operating span of 1200 ft., with an average haul of 900 ft. Depth of the pit is approximately 85 ft.

Due to the long haul and digging depth, Olean uses shovels at the shore line to supplement the Slackline and maintain the 200-tph. capacity of their new plant. Mr. R. W. Bisett, President, states:

"No one has yet come up with a better way of getting material from below the water line than Sauerman."

During freezing winter months when the plant is not operating, the Slackline Cableway is kept running to build a stockpile of material. A 110-ft. mast permits building the pile to a height of about 75 ft. All digging, elevating, conveying and dumping operations are handled by the hoist operator. Gravity return of the bucket to the excavation completes the fast operating cycle.

Where long range excavation or deep digging is required, it pays to use a Slackline Cableway. Contact Sauerman for specific recommendations on your job. Catalog C, *Slackline Cableways*, gives more information on this materials handling method.

SAUERMAN BROS., INC. 630 SO. 28th AVE. BELLWOOD, ILL.
LIndon 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent Scrapers • Slackline and Towline Cableways • Durolite Blocks

Enter 1026 on Reader Card

(Continued from page 46)

Mill safety—The Big Payoff

IN CONJUNCTION with a workable safety program, the National Safety Council has issued a pamphlet, The Big Payoff, which sights life, health and prosperity as the jackpot winnings of safety and is available through the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

J. R. Boyd, Executive Director of the National Crushed Stone Association, when recommending the pamphlet, pointed out that accidents do not always happen to "the other guy." In his estimation, "This brochure illustrates the terrible cost of accidents to all concerned: to the injured man in pain and loss of income, as well as to the company in damaged equipment and loss of profit."

New board plant plans for housing pickup

CONSTRUCTION IS UNDERWAY on a multi-million-dollar gypsum board plant to expand the manufacturing facilities of Gypsum, Lime & Alabastine Ltd., Caledonia, Ont., Canada. The completion of the 450,000-sq. ft. plant, scheduled for early spring, will boost the production capacity for gyroc lath, wallboard and sheeting by 70 percent. The major expansion anticipates a rising demand for building materials as the housing market recovers during 1961.

(Continued on page 52)

Enter 1027 on Reader Card

PRODUCTION – *NEW STRENGTH FOR SOUTH KOREA*

Private enterprise is turning South Korea into an industrialized, highly productive country, to the benefit of all her people.

This is exemplified by the Mungyong plant of Korea Cement Manufacturing Company, Ltd., which operates two F.L. Smidth rotary kilns, each 3.15 • 2.85 • 3.15 metres dia. x 123 metres long.

"MAGNECON" kiln liners, uniquely the product of Canadian Kilmar magnesite, are used in the hot zones of these kilns. The "MAGNECON" liners contribute substantially to economy of operation by giving roughly five times the service life of previously-used refractories. A recent report from Korea Cement, covering 335 days of service, concludes "The quality of 'MAGNECON' is superior and satisfactory."

CANADIAN REFRACTORIES LIMITED
CANADA CEMENT BUILDING, MONTREAL, CANADA

Write for technical folder "'MAGNECON', the hot zone refractory to keep your kiln on the line".

2318

High Capacities of clean materials
Developed from the world's first all-steel log washers built by McLanahan & Stone in 1894, these machines produce high tonnages of exceptionally clean materials—removing tough clay, soft rock and refuse with unequalled speed and economy • Available in Washmaster and Mudmaster styles.
Write for Bulletins WLO-1155 and MM-90.
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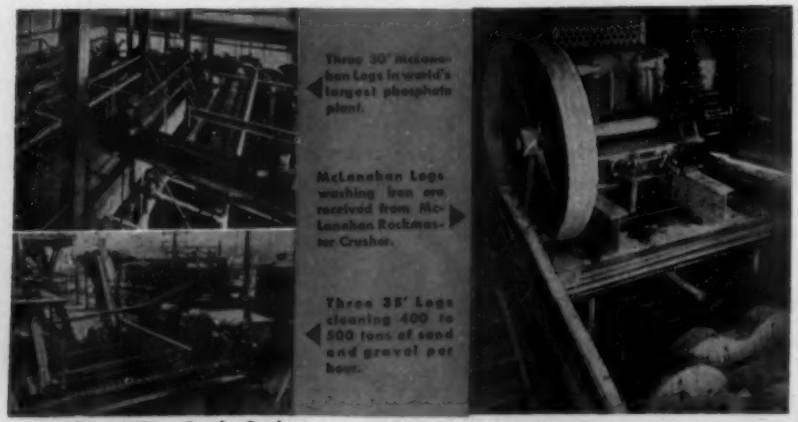
McLANAHAN & STONE CORPORATION
253 Wall Street, Hollidaysburg, Pennsylvania


Three 30" McLanahan Logs in world's largest phosphate plant.
McLanahan Logs washing iron ore received from McLanahan Rockmaster Crusher.
Three 35' Logs cleaning 400 to 500 tons of sand and gravel per hour.

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(Continued from page 50)

Russian engineers inspect U. S. industry

"THIS IS AMERICA" was a Russian engineer's appraisal of the Ideal Cement Co. plant in Ada, Oklahoma. He was one of 12 Soviet specialists in cement and concrete who toured American plants and building projects late last year.

The group, headed by B. G. Skramtaev, a professor at the Soviet Academy of Construction & Architecture, was returning a visit made to Russia by 10 U. S. scientists and engineers.

It can be readily assumed that the Russian delegation found a first-hand look at American operations more valuable than the question-and-answer sessions held between the two groups in the Soviet Union. A point of agreement, for instance, was that servicing plants in the two countries had much in common. One basic dissimilarity exists in that Russian factory workers do not observe commonly accepted safety engineering rules.

"Concrete is cheap and plentiful in Russia," reported the Americans after their tour. "Hence, 85 to 90 percent of housing and public buildings are put together with this material."

Since quota there is an all-consuming incentive, construction results have been called "uninspired, square-walled masonry." The strongest criticism of Russian efforts was in the sacrifice of quality to quantity. Poor workmanship also causes many maintenance problems. Buildings erected only a few years ago now look many years old.

The Americans found Russian zeal for mechanization impressive, but believed they were over-equipped in many areas. Elaborate conveyor systems in some factories cause an inefficient criss-cross flow of raw materials and manufactured products.

On the achievement side of the ledger are Soviet experiments with concrete capable of resisting temperatures up to 3,500 deg. F., ostensibly for use in ore extracting processes.

What's coming in March

The rock products industry has been doing research long before the space age made it popular. Joe Bell, special features editor, recently visited the laboratories of the National Sand & Gravel Association to describe their research programs and achievements

Experts commented that such concrete could be of great value in such military projects as missle launching pads.

These exchange tours, arranged by the U. S. State Department in cooperation with the Soviet Academy, were both 30-day projects. The American delegation, headed by H. Allan Bates, vice president in charge of research and development for the Portland Cement Association, visited 10 major cities in a representative sampling of Russia's 2,000 cement plants and concrete products factories.

Soil stabilization with phosphate products

A NUMBER OF STUDIES have demonstrated that phosphate products, particularly phosphoric acid or rock phosphate treated with sulphuric or phosphoric acid, have great value to stabilize some types of soil. These were the conclusions presented at the 40th Annual Meeting of the Highway Research Board, January 9 to 13 in Washington.

Clay soils in Missouri have yielded promising results in a series of tests for the last two years, reports J. W. Guinee, soils research engineer of the Missouri Highway Department. Up to four percent phosphoric acid was reported to be of value to stabilize some fine-grained plastic soils that normally have little or no compressive strength. This is the conclusion of highway research engineers in the U. S. Bureau of Public Roads, James A. Kelley and Earl B. Kinter.

Other papers on phosphate stabilization included a study of clay-phosphoric acid reactions by Turgut Demirel and Donald T. Davidson of Iowa State University; a study of the mechanism of soil stabilization by Monsanto Chemical Co's J. W. Lyons, G. J. McEwan and C. D. Siebenthal; and a study of the basic improvements in phosphate soil stabilization by J. B. Hemwall and H. H. Scott, The Dow Chemical Co.

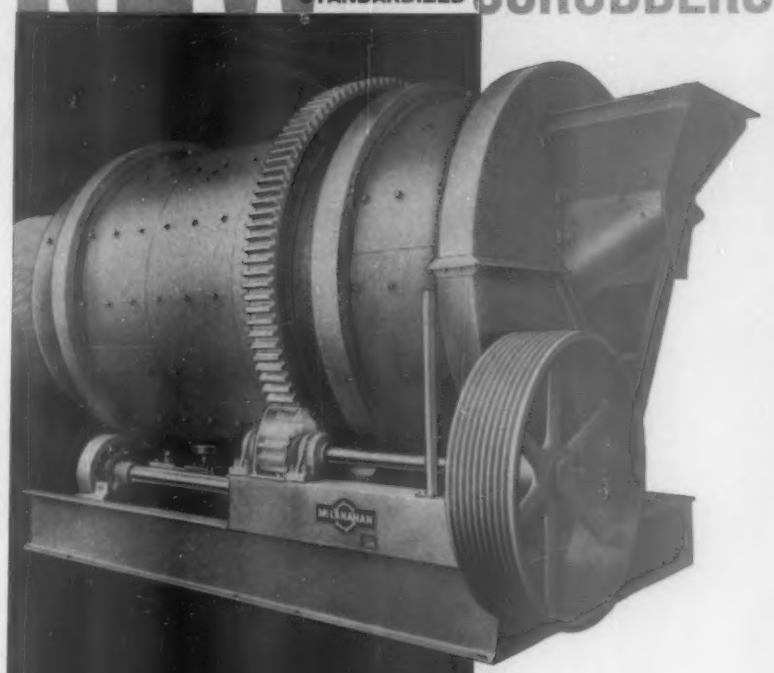
Reconstituted lime used in paper processing

THE MOSINEE PAPER MILLS CO., Mosinee, Wisc., has installed a $500,000 lime recovery system which will reduce from 630 to 50 lb. the amount of new lime that must be used to process a ton of pulp.

Used lime sludge, discarded in the past, is now fed into a 140-ft. rotary kiln. The machine, built and supplied by Allis-Chalmers Mfg. Co. of Milwaukee, converts the sludge into usable lime.

(Continued on page 54)

NEW HIGH-CAPACITY STANDARDIZED SCRUBBERS



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TYPE HD HEAVY DUTY

With capacities from 60 to 250 tph, Scrubbers in this new series are ruggedly constructed and designed for excellent results with a minimum of water, power and maintenance. Specify McLanahan H-D Heavy Duty Scrubbers for efficient removal of dirt, loam, light clays, soft rock and similar materials from sand, gravel, crushed stones and ores.

Ask for New Bulletin HDS-70

- Optional desander for separating fine and coarse materials.
- Renewable tires on drum, trunnions and thrust rollers.
- Cut gears . . . Abrasive-resistant liners . . . Perfect concentricity of drum, tires and gear.

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HOLLIDAYSBURG, PENNSYLVANIA
Pit, Mine and Quarry Equipment Headquarters Since 1835

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(Continued from page 53)

Building boom In Florida phosphate

GREATER DEMAND, new developments and methods of manufacturing have catapulted the Florida phosphate industry into rapid expansion. Four producers involved with plans for improvement and expansion are: International Minerals & Chemical Corp., Smith-Douglas Co., Armour & Co. and the U. S. Phosphoric Products Div. of the Tennessee Corp.

In October IMCC announced the projected building of a million-dollar phosphate calcining plant at Bartow, Fla., adjacent to an existing plant. Frank M. Murphy & Assoc. have been awarded the contract for construction. A greater consumption of rock at IMCC's Noralyn plant will add considerably to the number of man hours needed for the increased production. Plans for controlling waste from the new plant have been submitted to the Florida Board of Health and have been approved. Orders for the first shipment of calcined rock are from the Port Maitland, Ontario plant of Electric Reduction, Ltd.

A second expansion program has been completed at Lakeland. Here, the Smith-Douglas Co. extended their flotation pilot plant facilities at the company's Tenorac mine. An integral part of the new plant, engineered and constructed by Wellman-Lord Engineering, Inc., is the Hollingworth flotation cell. This discovery will make for considerable savings in future production. Development of the system was carried out at S-D Florida Laboratories near Plant City.

U. S. Phosphoric has embarked on a growth schedule, the cost of which will be $30 million. Under construction is an ammonia plant south of Tampa. The new facilities will increase output by 50 percent. It is expected that the program will be completed by early 1962. Improvements are also on the agenda for present facilities. With the discovery of a new product, Di-MoN, exclusive with U. S. Phosphoric, present mill production is being stepped up to meet the increasing demand.

Armour & Co. has contracted for the building of a phosphate rock processing plant in Polk County, Fla., tripling the company's capacity to produce phosphate products. To be completed in 1962, the new phosphate plant is part of a $60 million program. Thus, within a year, Armour's investment in chemical processing will be equal to that in food processing.

A phosphoric acid and triple superphosphate plant was part of the award made to Chemical Construction Corp., New York engineering firm. Other major sections of the new plant will be built by Rust Engineering Co., who also have the engineering management contract.

Chicago firm signs as Canadian supplier

INTERNATIONAL MINERALS & Chemical Corp., Chicago, has signed a multi-million-dollar contract with the Electric Reduction Co. of Canada, Ltd. Under its terms, International will supply the company with calcined phosphate rock and also act as sales agents for its phosphatic fertilizer solutions and like products.

Vice President Leonard W. Gopp announced that the phosphate rock will be mined at Notalyn, Fla. The Canadian firm, a subsidiary of Albright & Wilson, Ltd., London, will manufacture triple superphosphate, phosphatic fertilizer and industrial phosphate at a plant now under construction at Port Maitland, Ont.

(Continued on page 56)

JOB REPORT

VERSATILE BLADE MOVES MORE

"With a Balderson U-dozer I can always get the job done, whatever it is. I've made ditches, fed hoppers, worked on road jobs, leveled land, and cleaned reservoirs. Whatever the job, you always have a positive load every trip. I'm well satisfied with my Balderson U-blade, and have used it for about everything."

H. D. Holland
General Contractor
Grand Junction, Colorado

BALDERSON INC.
WAMEGO KANSAS U. S. A.

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Please send me more information on teaming Balderson U-blades with Caterpillar machines. I am mainly interested in a Balderson U-blade for a Cat_____(model) for_____(use)

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2200 HOURS OF WORK— NOT ONE MINUTE OF DOWN TIME

2200 hours of trouble-free service. That's the record established by this D7D Tractor since its delivery last May to the Calera Quarry in Birmingham, Alabama, a division of the Vulcan Materials Co. The machine handles stockpiles, working two eight-hour shifts, five days a week.

There are several reasons behind this dependable service. Consider, for example, the tractor's Caterpillar lifetime lubricated track rollers. Bigger and stronger than former D7 rollers, they *never* need attention until rebuild time—*and rebuild time is a long time coming.*

The tough undercarriage is only one important feature of the new D7 . . . there's a 140 HP CAT TURBOCHARGED ENGINE that pushes blades full of rock with only ounces of fuel . . . there's an exclusive CAT OIL CLUTCH that will outlast any dry-type clutch . . . there's a PRESSURE-LUBRICATED POWER TRAIN that ignores shocks and heavy loads, keeps the tractor producing season after season . . . and there are other features like the new DRY-TYPE AIR CLEANER that takes out *at least* 99.8% of all dirt even under the worst conditions, and takes only about five minutes to service.

A new D7 could be the tractor you need in your operations . . . talk it over with your Caterpillar Dealer . . . there's no better place to invest equipment dollars.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

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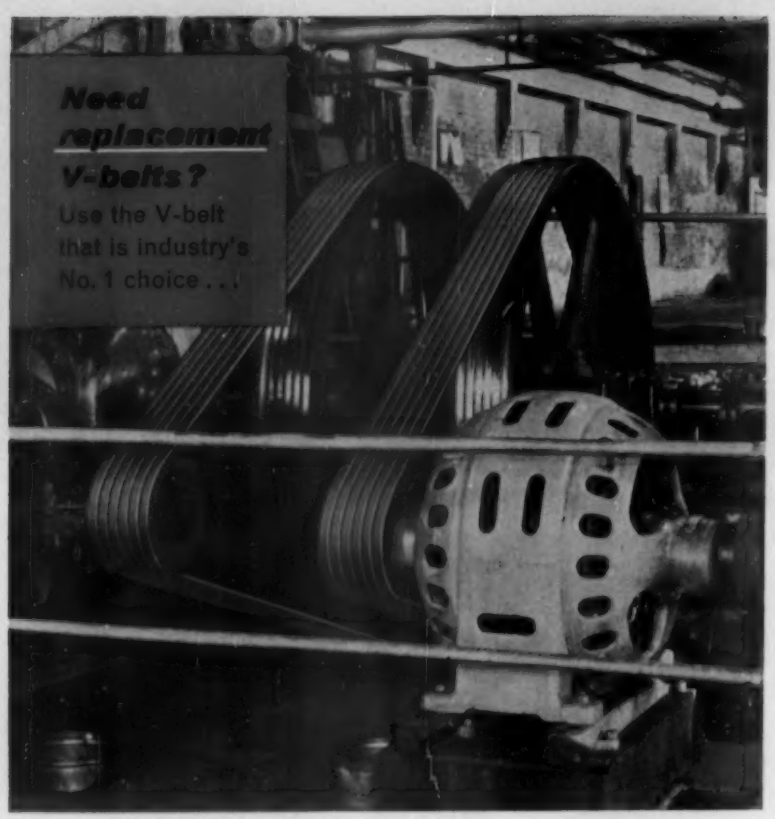
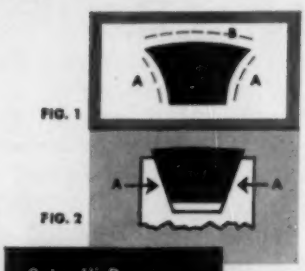
DEPENDABLE PRODUCTION WITH A NEW D7D



Gates Hi-Power V-Belts give you longer service life on your drives

Concave sidewalls (U.S. Pat. No. 1813698)—It is easy to see why Gates Hi-Power V-Belts give far longer belt life than ordinary V-belts. *Just make this simple test:* Bend a Gates V-Belt as if it were going around a sheave. Feel how the concave sides (Fig. 1-A) *fill out* . . . become perfectly straight (Fig. 2-A) to make *full contact* with the sides of a sheave. The belt thus grips the sheave evenly, and distributes wear uniformly across the sides of the belt, lengthening belt life.



Precisely-engineered arched top—The arched top (Fig. 1-B) of the Gates Hi-Power V-Belt prevents any distortion of the tensile section cords as the belt bends around the sheave . . . the load is uniformly distributed with each cord carrying its full share.

You will get fast delivery of Hi-Power V-Belts from the local stock of your nearby Gates Distributor. Call him today.

The Gates Rubber Company
Denver, Colorado

BP-6

Gates Hi-Power V-Belts

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INDUSTRY NEWS

(Continued from page 54)

West Germans tour American quarry

GUESTS FROM WEST GERMANY, delegates of the crushed stone industry there, were witnesses of an American-style blasting demonstration at the Houdaille Chimney Rock operation in New Jersey.

Their visit to the site was part of a tour of American quarries to learn whether techniques applied here can be successfully implemented in West Germany. The group was interested in automatic quarrying machines.

Representatives of the U. S. crushed stone industry had recommended they visit the Houdaille Construction Materials firm as the company's activities include crushed stone, sand and gravel, ready-mix concrete and bituminous concrete. Since Chimney Rock is one of the largest quarries on the East Coast, the West Germans were able to view a variety of American methods.

Johns-Manville builds perlite mill

THE LEGENDARY "Seven Hills of Taos" is the site of a very real and efficient new perlite processing plant. This is Johns-Manville's million-dollar mill at North Agua, N. M., with an annual capacity of about 150,000 tons of processed perlite. The new mill takes raw material from a 2,000-acre deposit that is several hundred feet deep—enough to last the mill well over 100 yr.

The five-level mill building is described as the largest and most modern in the industry. It replaces the smaller mill building, destroyed by fire, that was purchased from F. E. Schundler & Co. of Joliet, Ill. Nine separate silos now store 2,150 tons of processed perlite ready for truck shipment to

Antonito, Colo., some 25 miles north. There a blending and loading plant prepares the material for shipment.

Concrete and corrugated asbestos-cement siding assure that the new building will be fireproof while glass-fiber panels bring daylight into the building. Since the new mill will be operated continuously during severe winter weather in the northern New Mexico mountains, perlite ore will be stockpiled during the fall.

Seventeen million miles of circles come to end

THE LARGEST highway research project ever undertaken was concluded November 30 after a total of almost 10 yr. of preliminary testing and research. Since 1956 more than 300 G.I.'s, members of the Army Transportation Corps, have tested a specially constructed, 8-mile track of highway.

Conducted at Ottawa, Ill., the project was undertaken to learn the endurance of the truck drivers and the durability of different types of road construction.

The cost of carrying out the work was $27 million. Altogether, 126 trucks loaded with concrete block weighing up to 48,000 lb.; a track including 6 loops, 18 bridges and 836 kinds of asphalt and concrete pavement construction were utilized. The drivers covered a total of 17-million miles.

Results of the project will be known at the end of several months when Army scientists will have analysed more than 200-million pieces of data collected from instruments built into the road and meters attached to the test trucks and the road.

No definite conclusions have been drawn as yet, but indications are that results of the research findings can be expected to lay a pattern of statistics which will be the basis for generations of road construction. At present, tentative conclusions denote that concrete highways are being built thicker than is necessary, but that blacktop highways could be filled deeper.

The project, planning for which began in 1950, was sponsored by the American Association of State Highway Officials and directed by the Highway Research Board and the National Academy of Sciences—National Research Council. Financial responsibility was shared by the 50 states, the District of Columbia, the Territory of Puerto Rico, the U. S. Bureau of Public Roads, the Automobile Manufacturers' Association, the American Petroleum Institute and the American Institute of Steel Construction.

(Continued on page 59)

Gates Super High Capacity V-Belts save drive space, weight, money

If you are designing a new drive, or if the belts and sheaves of a conventional V-belt drive must be replaced, you will benefit many ways by installing a Gates Super HC High Capacity V-Belt Drive.

Gates Super HC V-Belt unites new, high performance materials with a basic change in the shape of the belt itself. Because of this, it is able to handle up to 3 times the horsepower of a conventional V-belt in the same space. As a result, Gates Super HC Drives can often cut in half the space required for your drive. Drive costs are cut as much as 20%, and drive weight reduced 20% and more. Guards can be smaller. Bearing loads are less, increasing bearing life. And the drive can operate at belt speeds up to 6000 ft/min without dynamic balancing!

There is a Gates Field Engineer serving your area. To contact him for help in designing a new drive, call your nearby Gates Distributor.

Exclusive design features include: precisely engineered arched top, concave sidewalls, Flex-Weave cover, super strength tensile construction.

Gates

Building the future on 50 years of progress

The Gates Rubber Company
Denver, Colorado

BP-7

Gates Super HC V-Belt Drives

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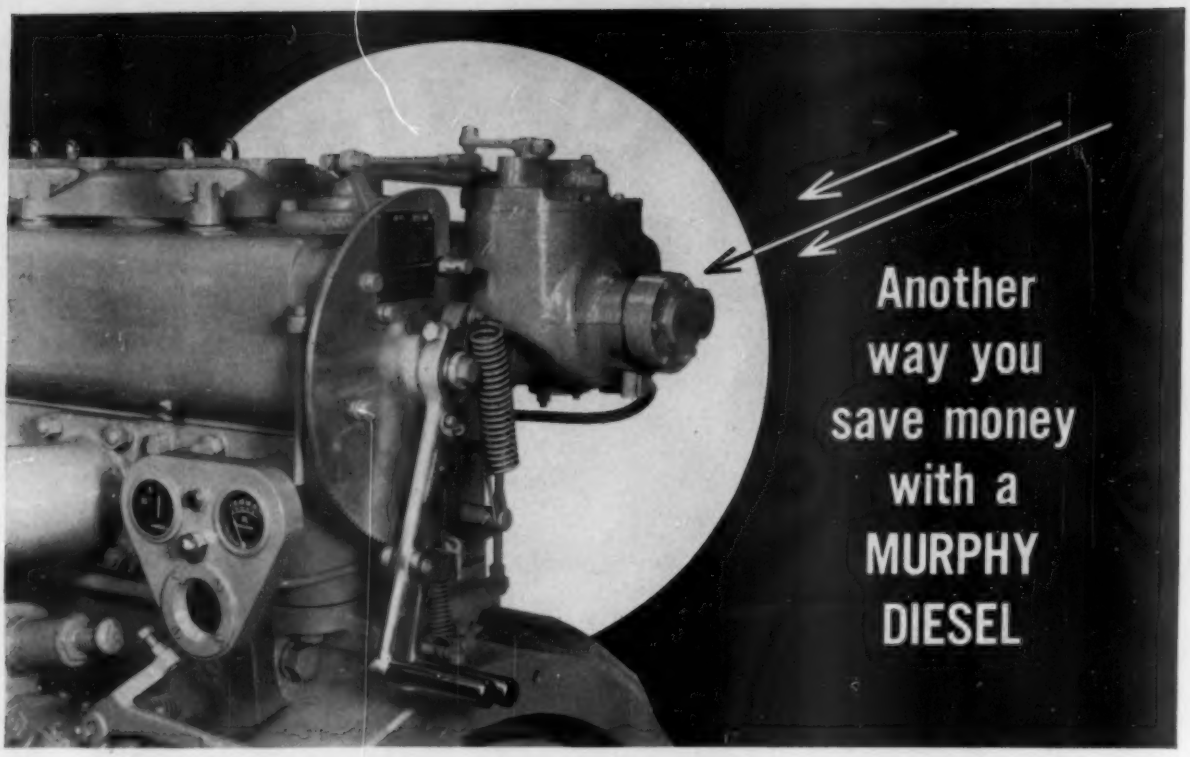

HYDRAULIC SERVO-TYPE GOVERNOR pays off in profit

assures instant response to load change
protects engine from damage

One diesel engine characteristic of prime importance to your operation is the ability to respond *instantly* to varying loads, as well as assure accurate speed control for steady loads. Murphy's Hydraulic Servo-Type Governor utilizes lube oil pressure to adjust injector controls for precise, immediate response throughout the engine's speed range, from idling to full speed. This type of control assures better combustion at all times to save you fuel dollars. It minimizes abnormal operating conditions that cause excessive wear.

An important safety feature . . . If lube oil pressure drops below a safe level, the governor automatically shuts off the engine, protecting it from possible damage.

The Hydraulic Servo-Type Governor is one of many exclusive Murphy design features. Ask your Murphy Diesel Dealer to explain the combination of features that make Murphys first choice for dependability and economy.

OTHER MONEY-SAVING MURPHY FEATURES

UNIT FUEL INJECTORS precisely control fuel injection, permitting "true" diesel operation. Starting is easier and operation smoother.

PLAIN, OPEN COMBUSTION CHAMBERS assure *complete* combustion for maximum power from each drop of fuel with less engine wear.

FOUR VALVES PER CYLINDER have greater breathing capacity and permit higher power output. Because they run cooler, valves rarely have to be ground.

Murphy Diesel MP Series engines and power units, 105 to 320 HP; generator sets, 60 to 227 KW; dual fuel engines, 147 to 227 HP; marine engines, 105 to 315 HP.

MURPHY DIESEL ENGINE FEATURES MEAN MORE PROFITABLE OPERATION

MURPHY DIESEL

MURPHY DIESEL COMPANY

5315 W. Burnham St., Milwaukee, Wisconsin

SALES . . . PARTS . . . SERVICE

419-RO **Throughout the Nation**

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(Continued from page 57)

ASTM publishes 1960 Standards

THE AMERICAN SOCIETY for Testing Materials has announced the publication of a new book, ASTM Standards on Mineral Aggregates & Concrete. The publication contains statistics and findings compiled by the society's committee on concrete and concrete aggregates, and also the road and paving materials committee. Included are pertinent specifications for cement.

A companion book to this publication is available covering all materials of a bituminous nature used in highway construction and in the waterproofing and roofing fields.

This book is recommended by the publishers for producers and consumers of mineral aggregates, concrete and highway materials, and to researchers and other personnel connected with these industries.

What's coming in March

Dolomitic limestones provide an almost inexhaustible supply of raw ores for metallic magnesium. Limemaking is the first step in the process that Alabama Metallurgical uses to derive magnesium from these "common" limestones

Methods of testing, 134 standard specifications, recommended practices, and definitions of terms for mineral aggregates, concrete, curing materials and other related subjects are presented. Of these standards, 50 are new, revised or have had their status changed since the 1958 edition was published.

Copies of the present edition may be obtained from ASTM headquarters, 1916 Race Street, Philadelphia 3, Pa., at $5.75 per copy.

Hungary builds new cement works

A CORRESPONDENT for British Cement Lime & Gravel recently visited a burgeoning Hungarian community, yet to be completely developed. It is located on a plain about 25 miles north of Budapest, on the shores of the Danube.

Here, a cement plant is being constructed under the direction of a construction engineer. More than 2,000 men and women work on the project, which Hungary claims will become the biggest and most modern in Central Europe.

The final cost is expected to be $250 million. In addition to building the cement-making installation itself, plans include the construction of 2 railway stations, laying 50 miles of pipeline, and establishing a port to bring in foundry slag from the Sztalinvaros Danube steel works.

April 1963 is the scheduled date for putting the first kiln into production, and January 1965 for the last one. There will be three oil-fired kilns.

The plant, it is anticipated, will have an annual output of one million tons. At present, the whole Hungarian national production is said to be 1,200,000 tons. Since cement is a vital factor in Hungarian economy, this operation is one of the more important under the current 1961-65 Five Year Plan.

Limestone from a mountain range nearby will be quarried and brought by rail to the new industrial center. About half of the labor force plan on continuing there after construction is completed.

(Continued on page 60)

Refractories that last longer

- Extensive Line of Plastic and Castable Refractories to *Exactly* Meet Any Service Condition
- Refractory Engineering to Precisely Match the Proper Refractory to the Job—No Matter How Large or Small
- Installation by Highly-Skilled Company Representatives Makes Certain Engineering Recommendations are Followed

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THE NEW FORGED

CAPE ANALLOY DROP BALL

outlasts them all!

2,000-
12,000 lbs.

A tough abrasive resisting Alloy Steel — **HEAT TREATED** for maximum wear. Field tested for ruggedness and dependability.

All "Cape Ann" **FORGED** Steel Drop Balls fully guaranteed!

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ANCHOR & FORGE CO.
P. O. BOX 361
GLOUCESTER
MASS.

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INDUSTRY NEWS

(Continued from page 59)

1959—Record year for Florida phosphate

THE FLORIDA PHOSPHATE Council announces that record exports in 1959 accounted for more of the State's phosphate production than ever before. This has been despite stiff competition from North Africa, Russia and other countries having phosphate deposits.

With Japan as the leading customer, a total of $22,871,000 in phosphate rock was shipped from Tampa and Boca Grande. Other smaller, but substantial customers were West Germany, Canada, Italy, the United Kingdom, Netherlands and Spain. Japanese buying accounted for 1,126,768 tons, and the other countries, together, for 1,475,000 tons.

The best previous year, the Council reported, was 1958 when $19,615,000 of phosphate rock was shipped from Florida.

Compared with the same federal government figures, exports of superphosphate decreased in 1959, indicating that foreign plants are now processing phosphate rock into forms suitable for agricultural and industrial use.

Marquette continues expansion

THE MARQUETTE CEMENT Mfg. Co. has announced they are taking over a second smaller cement company in two months. In November, Marquette assumed the liabilities of North American Cement Corp., and consequently acquired plants at Catskill, N. Y., Howes Cave., N. Y., and Security, Maryland.

In December, Marquette announced an agreement with the Pittsburgh Coke & Chemical Co. for the Green Bag Cement Co. Included in the purchase are a producing plant on Neville Island, Pittsburgh, and shipping plants at Marietta and Fairmont, West Virginia.

Marquette is issuing 150,000 shares of its common stock to Pittsburgh Coke & Chemical Co. which will hold the Marquette stock as an investment in exchange for the acquisition. Previously issued were 575,158 common shares for each 1¼ common shares of North American for distribution to the latter's shareholders.

The facilities and personnel of both North American and Green Bag will continue as before the mergers.

(Continued on page 65)

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How many "machines" is a MODERN LOADER?

JOB-PROVE the 4-in-1 and see...

Here's what the 5 Four-in-One's, shown, are doing: (1) (Left foreground) The 3-cu. yd. TD-20 rig is 'dozing; (2) (Right foreground) The ¾-cu. yd. T-340 outfit as "carry-type scraper;" (3) (Right center) The 1⅛-yd. TD-6 4-in-1 "semi-skids" load on its skid shoes; (4) (Center): This 2¼-cu. yd. TD-15 "biting bucket" clam-handles a stump; (5) (Rear) TD-9 rig is back-dragging gravel!

It's a whole equipment spread of job-getting actions, if it's "the bucket with the bite"—an exclusive clam-action International Drott 4-in-1.

"Dragonized" to dramatize "the bucket with the bite," the five 4-in-1 sizes above demonstrate *plus* actions you get with the exclusive clamshell.

Full-capacity, full-range, depth-controlled bull-dozer performance. "Carry-type scraper" action to grade, strip, or spread with inch-close accuracy. Skid-Shovel action to "semi-skid" full buckets of material. Controlled back-dragging clam-action, to grade, pick up, or pull down materials. "Clamming-on" action to grab and load heavy unwieldy "impossibles."

Note also the 4-in-1 gives you the top excavator-loader performance on the market! That includes certified break-out forces ranging from 11,200 lbs. with the T-340, to 43,150 lbs. with the TD-20. And only the 4-in-1 gives you clam-type bottom dumping—that ends sticky materials loading problems, for good!

See for yourself how many "machines" the only *modern* loader is! Move the 4-in-1 machine-action selector lever. Prove you get a whole spread of money-making actions, that obsolete "single-action" loaders, and double for a yard-full of limited-duty rigs! See your International Drott Distributor for a 4-in-1 demonstration.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL® DROTT®

"My TD-24 almost equalled ...My faster TD-25's

size-bigger crawlers *deliver larger loads"*

—Charles W. McClinton, Oakman, Alabama

"Actual on-the-job demonstration proved my 4-year-old International TD-24's daily production approximately equalled size-larger competitive crawlers," reports Charles W. McClinton, for McClinton Coal Company, Oakman, Alabama.

"My TD-25's are faster all-around, and deliver larger loads than the '24.' Planet Power-steering lets the operator cut big loads faster (than a clutch-steered, king-sized crawler)—and delivers the loads at a constant speed without loss of power on turns."

"Dead-track drag" eliminated

Planet powered International TD-25's keep both tracks pulling full-time—to make full-load, full-power turns, or slam straight ahead with offset loads. And combined on-the-go, Hi-Lo power-shifting gives instant, up-or-down matching of power to condition.

You make full-load turns, and keep the blade loaded. You get constant-contact benching or highwalling, applying full power, getting full speed. "Dead-track drag" and "gear-shift lag" are eliminated.

Exclusive Planet Power-steering makes the TD-25 the industry's only power-shifted 8-speed gear-drive tractor or 4-speed torque converter tractor.

Power-shift and power-steer the 230-hp TD-25 on tough overburden removal, benching, and highwalling. Prove what it means to your operating efficiency to match or outproduce size-bigger, clutch-steered crawlers. See your International Construction Equipment Distributor!

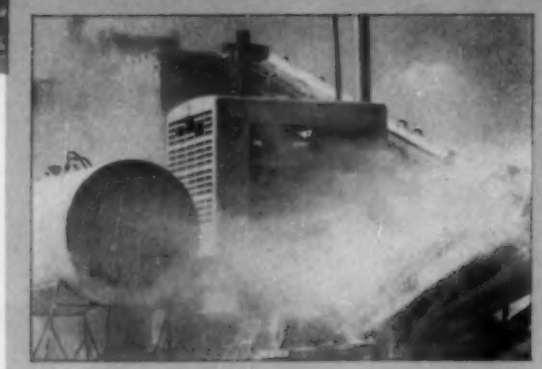
International® *Construction Equipment*

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

Overburden 20 feet deep, half earth, half rock, is being removed here to get at a 16-inch coal seam. This McClinton-owned TD-25 cuts down highwall, and removes berms. Operator simply shifts load-side track to high range, leaves other in low range to keep "25" on course without "bank-nosing."

Planet Power-steering and on-the-go, Hi-Lo power-shifting teams with the 6-cylinder, 230-hp International DT-817 diesel—to pick up and "run" with loads like this, on the McClinton strip-mining operation. Dual valving makes this engine a "free breather," to give peak turbocharging efficiency.

8 Years of steady power in a CLOUD OF DUST!



Latest boost to International's reputation for rugged dependability is the new turbocharged 385-hp UDT-817 diesel—ideal crushing power under all operating conditions.

Working 60 hours per week, this IH diesel has produced countless tons of material under the most adverse conditions. Production called for 50% minus 40 crushing—almost powder—which resulted in a constant cloud of abrasive dust floating around the engine. In spite of this, the rugged International diesel worked steadily for six years, took time out for an overhaul, then started off again with the same dependable service, adding two more years to the record.

Dust-defying International diesels are your surest investment for long, continuous performance under tough operating conditions. Full sealing protection keeps out abrasive grit, adding life to IH power on dusty crushing jobs. Inherent heavy-duty design assures trouble-free performance through continuous hours of big-capacity operation. And famous International economy keeps daily operating costs at a low figure.

International diesel delivers eight years of dependable power for Adrian Materials, Inc., Jefferson City, Mo.

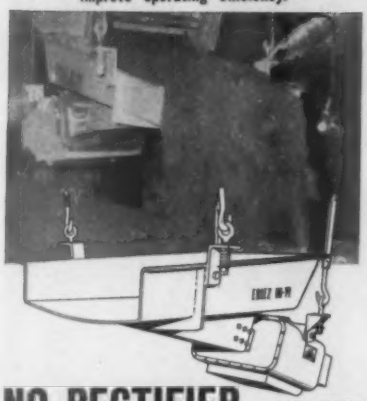
Your power requirements can be met quickly with a call to your nearby International Engine Distributor or Dealer. He'll give you full product information and installation assistance on 35 diesel or carbureted models—stripped engines to complete power units—from 16.8 to 385 max. hp. Call him today!

INTERNATIONAL® IH ENGINES

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Ill.
A COMPLETE POWER PACKAGE

ERIEZ Magnetic Minute

60 seconds that will help you improve operating efficiency.



NO RECTIFIER NEEDED WITH ERIEZ HEAVY-DUTY VIBRATORY FEEDERS

PATENTED

AC powered Eriez Hi-Vi vibratory feeders move large tonnages of bulk materials with accurate control . . . more efficiently and economically. Illustration shows one of a number of Eriez units available for heavy feeding applications where **big capacity and accuracy** are essential.

Whatever your application, there is an Eriez electro-permanent magnetic feeder that will meet your exact needs. And you get this exclusive combination of advantages: No rectifier needed . . . AC operation. Totally enclosed drive element ideal for hazardous, dusty, wet and corrosive installations. New fibre glass springs assure superior performance and control . . . longer life because spring breakage is practically eliminated.

The full line of Eriez Hi-Vi vibratory feeders includes models with feeding capacities ranging from ounces to many tons per hours.

Write for descriptive bulletin to:

ERIEZ MANUFACTURING CO.
202PA Magnet Drive, Erie, Pa.

MAGNA-THOUGHT

Constant research, development and refinement are the keys to new and improved products. New and improved products are the keys to a company's growth.

A. F. ISRAELSON
Chief Engineer

ERIEZ

A GROWTH COMPANY . . .
10 NEW PRODUCTS IN THE LAST 5 YEARS

Enter 1019 on Reader Card
Enter 1021 on Reader Card

INDUSTRY NEWS

(Continued from page 60)

Peerless expands

THIS MONTH marks the completion of a half-million-dollar expansion program by the Peerless Cement Co. in Grand Rapids and Schoolcraft, Mich., R. J. Morrison, president of the company, has announced.

Peerless recently installed new bulk cement storage silos and a distribution system. The expansion program was designed with consideration for nearness to markets and accessibility of both rail and trucking routes.

The Schoolcraft silos will service the southwestern part of Michigan and northern Indiana. The Grand Rapids expansion program was carried out with the intention of giving more expedient service to the Grand Rapids, Holland and Muskegon markets, served by Peerless since 1900.

The only multiple-plant producer in Michigan, Peerless operates three cement manufacturing plants, with two in Detroit and one in Port Huron.

J. R. Simplot acquires Anaconda phosphate plant

J. R. SIMPLOT CO. has acquired the phosphate products plant at Anaconda, Mont., of Anaconda Co. Simplot also has entered a long-term lease at Anaconda's open-pit phosphate mine at Conda, Idaho. For the time being, Anaconda Co. will continue to operate the plant at Anaconda, Mont. Ultimately, this plant may be moved to Pocatello, Idaho, where Simplot has a phosphatic complex.

According to the Salt Lake Tribune, Simplot has become the largest producer of phosphate fertilizers west of Florida. With recent expansions, the firm will be producing phosphate fertilizers at the rate of 1,000 tons daily.

(Continued on page 67)

ERIEZ Magnetic Minute

60 seconds that will help you improve operating efficiency.

PATENTED

How much will an ERIEZ PERMANENT MAGNETIC PULLEY save you?

Erium® powered Eriez magnetic pulleys save one firm $1200 a year by removing 50 pounds of tramp iron a week from coarse clay. They can save you as much—or more, depending on your application.

In addition to preventing machinery damage, Eriez permanent magnetic pulleys prevent fires and explosions; assure product quality.

The pulley illustrated is one of 192 sizes (up to 36" diameter in any belt width) made by Eriez. **There is one for your exact application.** Two basic models are available: **Type AA,** ideal for separating small and medium tramp iron and fine ferrous contamination; **Type CR,** which performs best in removing large pieces of tramp iron.

All models are engineered and constructed to give you the finest in automatic separation. All are powered by Erium®—our exclusively-designed power source. Model for model, Eriez units give you the finest quality and consistency of magnetic strength.

For descriptive bulletin write to:

ERIEZ MANUFACTURING CO.
202PB Magnet Drive, Erie, Pa.

MAGNA-THOUGHT

We willingly share our design and application know-how to help our customers find new ways to improve their plant efficiency and product quality.

E. J. TENPAS
Supervisor, Magnetic Engineering

ERIEZ

A GROWTH COMPANY . . .
10 NEW PRODUCTS IN THE LAST 5 YEARS

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SHEFFIELD MOLY-COP Grinding Balls

COPPER-MOLYBDENUM-ALLOY

has earned customer acceptance

More than a million tons of Sheffield Grinding Balls, used in every kind of grinding job, have performed with dependability around the world. Top performance can be expected from Moly-Cop because Sheffield alloying, heat-treating and forging are kept consistently uniform by Sheffield constant quality control. Result: Moly-Cop Balls retain their sphericity longer, to give a better grind at lowest cost per ton. The Standard of Comparison Around the World. **Sheffield Plants: Houston, Kansas City, Tulsa**

ARMCO Sheffield Division

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(Continued from page 65)

Sales of building supplies down

SUPPLIERS of building materials showed lower profits for the fourth quarter of 1960 than for the same period in 1959. A near record (1.5 million) new houses were under construction then. The figure for 1960 is 1,250,000. Private housing is considered the important factor limiting sales.

The chief impact of a business upturn, will not occur until the second quarter of 1961 and later, according to government economists.

Melvin H. Baker, chairman of National Gypsum Co., Buffalo, N. Y., has stated, "With the uncertainties about the new Administration, and the bad weather we're expecting, we feel sales will decline more before they get better." The return of warmer weather, however, is universally expected to bring an increase in public and private building.

Magnesia talc plant to close

THE EASTERN MAGNESIA TALC CO. has announced the shutting down of its Moretown, Vt., plant by April 1961 in order to concentrate production in the Johnson and Chester branches of the company in that state.

The diversion of the insecticide market from powder to liquid products, thereby decreasing the need for talc, was given as the reason for this change by the industry. The talc manufactured in the Johnson and Chester plants, of a better grade than that of the Moretown factory, is used in the roofing business and in the manufacture of rubber.

Mica shipments up 50% in period of 1954-1958

SHIPMENTS OF THE MICA INDUSTRY in the United States during 1958 were valued at $6.2 million, an increase of 50 percent over 1954. Facts are contained in a preliminary report from the Bureau of the Census, Department of Commerce.

Average employment in the mica industry showed an increase of two percent from 1954 to 1958, to a total of 726 employes. Value added in mining in the industry amounted to $4.7 million in 1958, up 42 percent from 1954 when the previous census of mineral industries was taken.

(Continued on page 71)

WASH WATER goes UP . . .

slimes cannot remix with sands

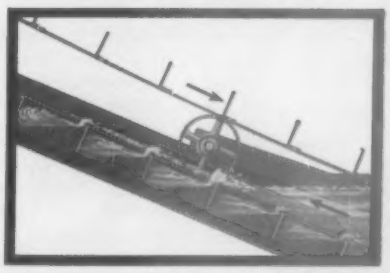
. . . in the "OVERDRAIN" Classifier

The "Overdrain" Classifier is a completely new device in the field of mechanical wet classifiers. The belt, with lifting flights attached beneath, moves upwardly out of the sand bed between two stationary side shrouds—creating the effect of a series of moving, closed, washing compartments.

The only outlet from these compartments is via holes in the belt above. Surplus liquid and slimes discharge through these "overdrain" holes without mixing with the oncoming sands. The end result is an extremely clean sand discharge, excellent de-sliming—making the "Overdrain" Classifier an ideal washing device.

Acid-proof construction available.

Write for Hardinge Catalog 39-C-7



Section through "Overdrain" Classifier showing upward-moving, closed, washing compartments.

Unretouched photograph of "Overdrain" action above the belt—water and slimes discharging upwardly.

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You can reduce your equipment investment because this D-120

pusher-dozer

can be converted into a tractor-shovel

Now you can buy a big, powerful rubber-tired tractor for bulldozing, push-loading or towing, with or without an optional package for converting the unit into a tractor-shovel.

This new D-120 PAYDOZER, in addition to its convertibility, has numerous engineering and design features which result in outstanding performance and ease of operation.

More power: Weighing 55,000 lbs., the D-120 is powered by a 300 hp. turbo-charged diesel which gives it a higher horsepower-to-weight ratio than other machines of similar size.

Better balance and stability: Approved and exclusive use of dry ballast in all four tires gives better weight distribution and lower center of gravity – dampens tire bounce and permits better blade control.

Inside push arms: Unlike crawler-mounted dozers, all rubber-tired units have push-arm brackets mounted on the main frame. The D-120 push-arms, however, are located inside front wheels, close to main frame for the most direct transfer of forces and the least strain. This also gives greater accessibility to the front wheels for hub and tire servicing.

"Full" power-shift transmission: Hough-built, this unit does not require stopping for range shifts. It is a full-reversing, constant-mesh type with four speed ranges, up to 26 mph., in both forward and reverse.

Matched torque converter: This is *not* a compromise converter for both dozer and shovel application. Instead it is designed specifically for bulldozing and makes fullest use of the tremendous engine power to develop maximum tractive effort. A torque-converter change is part of the bulldozer-to-shovel conversion package.

"Power-transfer" differentials: Provided on both axles for the best possible traction. When one wheel is capable of more tractive effort than the other on the same axle, it can automatically receive 38% more torque.

PAYDOZER is convertible to this H-120 PAYLOADER

"Three-way" power blade control: The D-120 blade is 12'-4" wide at the cutting edge and 4'-8" high. Adjustable from 1'-6" below grade to 3'-2" above; pitch adjustment of 35 degrees and blade tilt of 10 degrees on either side.

Hydraulic features: The system is closed and pressure-controlled to exclude air-borne dirt and foreign matter. Transmission and torque-converter oil is kept cool by a separate fan-cooled radiator.

Ease of operation: In addition to power-shift transmission there are twin hydraulic steering booster rams, and 4-wheel power air brakes with "Operator's-choice" brake controls – exclusive in its class. These dual foot pedals permit choice of braking with or without transmission engaged for any operating situation.

Standard equipment: Included are open-type cab, front and rear windshields and wipers, special lights and swinging draw-bar. Standard tires are 26.5 x 25 with 29.5 x 25 tires optional.

THE FRANK G. HOUGH CO.
705 Sunnyside Ave., Libertyville, Ill.

Send full data on the Model D-120 PAYDOZER

Name_____

Title_____

Company_____

Street_____

City_____ State_____

2-B-1

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
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HOUGH®

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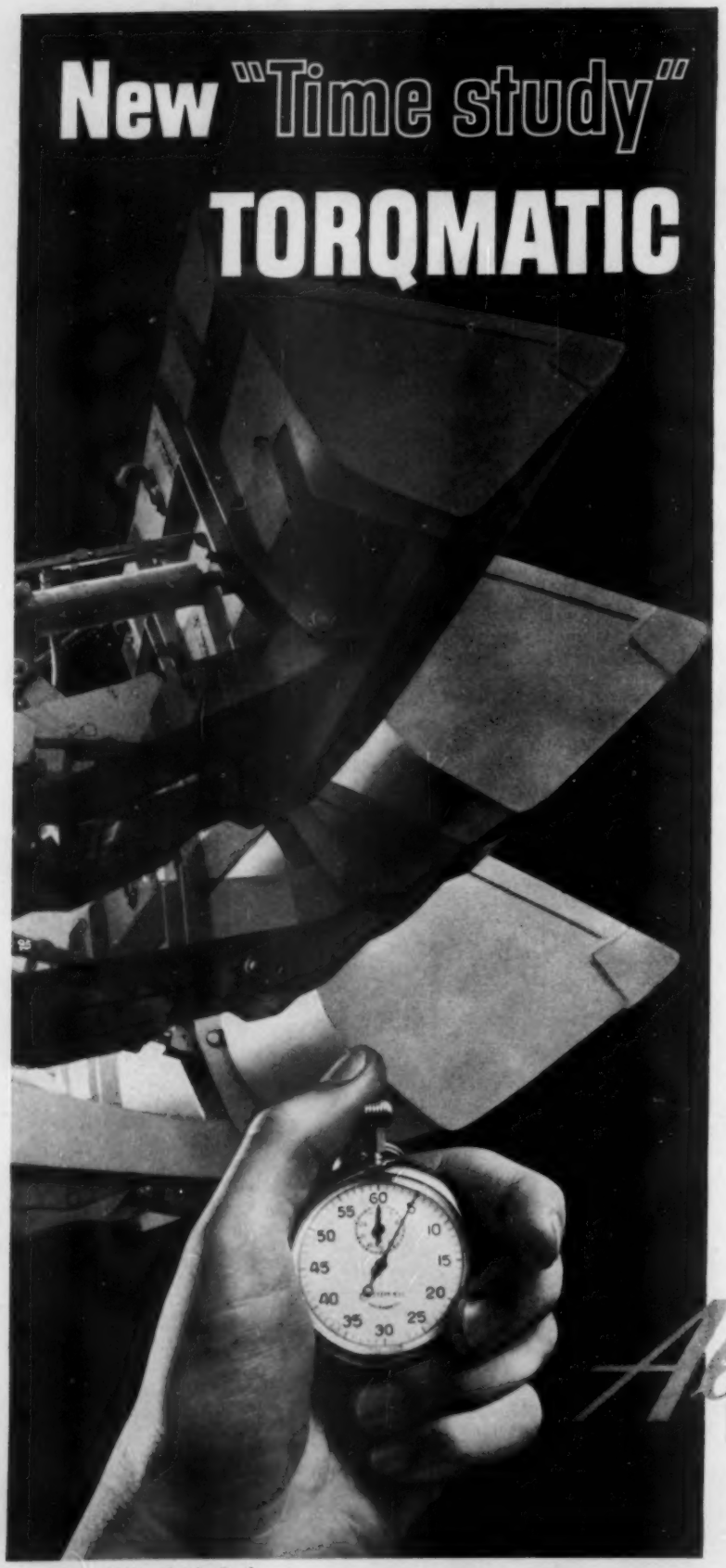
PAYDOZER®



3-SPEED

handles bigger loader power—speeds bigger loader jobs

Here's the new, more powerful hydraulic transmission loaders have long needed—the CRT-3531 "Time-Study" TORQMATIC 3-Speed.

Built for bigger jobs, it can handle 350 ft.-lbs. of engine torque . . . features a special high-efficiency, three-element torque converter with a stall torque ratio of 3.7 to 1 . . . provides total torque multiplication of 29.6.

And, because it has only 3 speeds instead of 4, it cuts the shifts operators must make—naturally the three-speed loaders crowd, dig, load and travel faster.

What's more, like the time-proved CRT-3331 "Time-Study" TORQMATIC, *it's designed to need no major service for two-engine overhauls.*

The reasons are clear: Integrated converter-transmission eliminates troublesome hoses . . . planetary (not countershaft) gearing splits tooth load three ways . . . clutches are up to twice the diameter of those used in other hydraulic transmissions.

Want the full story? Write Allison today.

Allison Division of General Motors
Indianapolis 6, Indiana
In Canada: General Motors Diesel Ltd., London, Ontario

Allison TORQMATIC

TORQMATIC® DRIVES

THE MODERN DRIVE FOR MODERN LOADERS

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(Continued from page 67)

Wet gas scrubbers

NEWLY DEVELOPED wet gas scrubbers, dust collection equipment, are being installed at Dewey Portland Cement Co.'s Linwood, Iowa, plant. The firm signed a contract for the use of inventor John Tailor's unit after studying the air pollution problem.

In February, 1960, they began testing the effectiveness of this invention and, during October, laid plans for its use. Work will be completed in a few months. The dust collector has been described as removing 98 percent of all cement dust discharged from the kilns, as well as clearing exhaust air of gasses of all kinds.

East meets West in plant site purchase

SOUTHWESTERN PORTLAND Cement Co., Los Angeles, has purchased a 40-acre riverfront tract in Addyston, Ohio. A distribution plant will be built on the property after the former owner, Ohio River Company, closes down the coal-handling terminal now occupying the site.

The announcement came almost simultaneously with the company's options taken jointly with the Marble Cliff Quarries Co. of Columbus on 600 acres of land near Mentor, Ky. The two companies will invest an estimated $50-million in development of sites for production of cement and specific types of sand and gravel used in making steel. An estimated 300 persons will be employed for the planned operations that will supply raw materials to both companies for use in their finished products.

South Euclid firm sold to Federal Lime

FEDERAL LIME & STONE Co. of Cleveland, Ohio, recently purchased the South Euclid Cement Co. for $500,000. Daniel J. Gorman, president of the company, said that the transaction included a yard producing 1,500 cu. yd. of concrete a day and a plant producing 1,000 cu. yd. Its annual sales volume is currently $2½ million.

President Gorham added that the company expects to double the present volume within two years. First step in its expansion program will be the establishment of a third yard with a capacity of 500 cu. yd. This should put Federal in a position to supply a major part of the building materials needed to meet the predicted rise in residential construction.

Federal's parent company, National Lime & Stone Co., is one of the nation's largest non-captive producers of stone for the steel and chemical industries and crushed stone for construction. It operates nine quarries in Ohio and is negotiating for acquisition of its 10th. In addition, it is considering the purchase of stone-bearing properties in the upper peninsula of Michigan to hold as reserve sources.

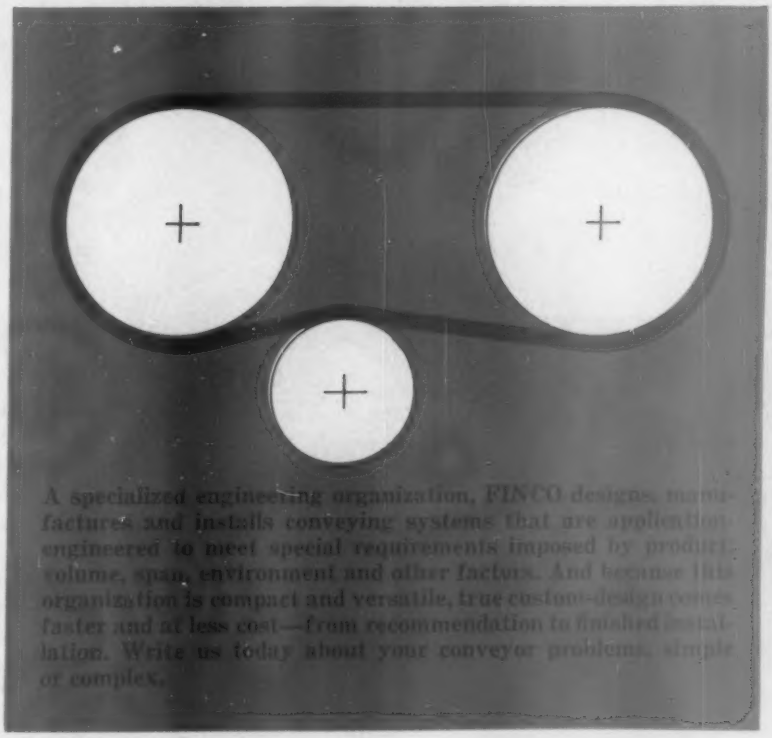
The subsidiary company, in turn, has been the largest shipper of flux stone for the steel industry in a four-state area and of commercial aggregate for the construction industry in Ohio.

An option to buy the Euclid Railroad Co. is also held by Federal Lime, its president revealed. It is the second-shortest railroad in the country with 1.8 miles of track connecting the Blue Stone Quarries with seven industrial plants, including the South Euclid Concrete Co.

When the companies consolidate—which will be in about two years—they will be known jointly as the Federal Lime & Concrete Co.

END

Finco Custom-Engineered Conveyors for heavy dry/bulk handling



A specialized engineering organization, FINCO designs, manufactures and installs conveying systems that are application-engineered to meet special requirements imposed by product, volume, span, environment and other factors. And because this organization is compact and versatile, true custom-design comes faster and at less cost—from recommendation to finished installation. Write us today about your conveyor problems, simple or complex.

DISTRIBUTOR INQUIRIES INVITED

For building your own conveyor units: Off-the-shelf conveyor components include FINCO troughing and return idlers, stringer sections, hoods, pulleys, belting, etc. Write for BELT CONVEYORS AND IDLERS bulletin.

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525 Rathbone Avenue, Aurora, Illinois • U.S.A.

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NEW SAND AND PRACTICALLY

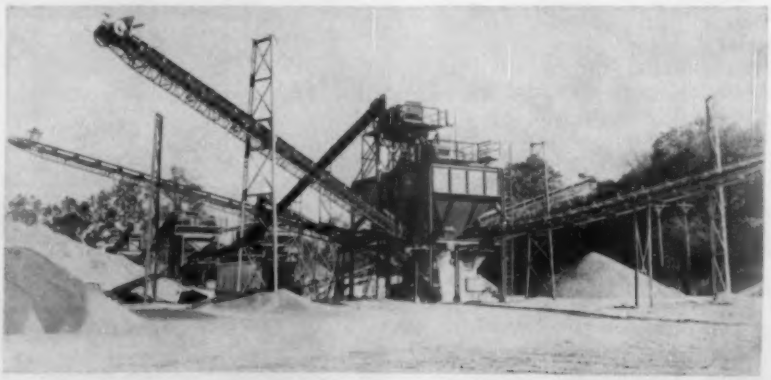
8 DEISTER Screens play key role in modern

IN DESIGNING THE PLANT shown above, Robert C. Myers, General Manager of Myers Gravel & Sand Co., sought to combine speed with an absolute minimum of operating attention and maintenance. The success of his efforts is confirmed by production records chalked up since the Anderson (Ind.) plant opened last June. Mr. Myers reports that full capacity production is 300 tons per hour.

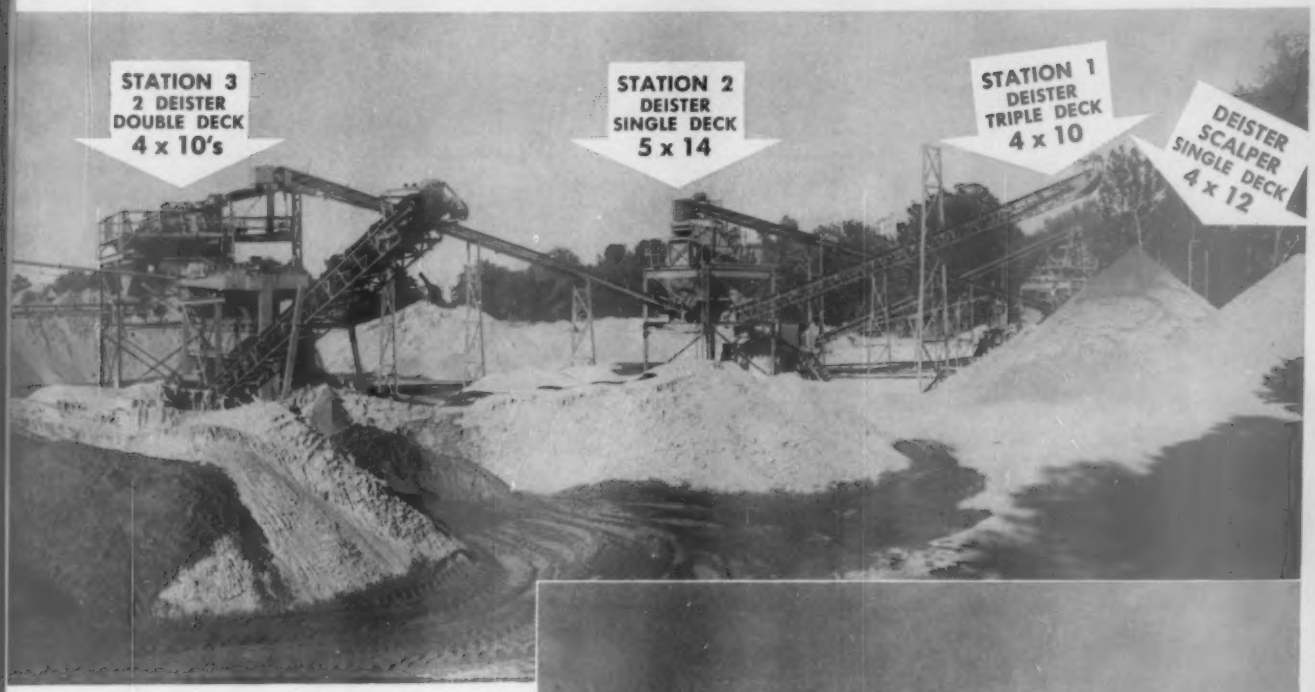
Every detail of the Myers plant is designed to make operation as automatic as possible. All-steel construction includes six stack conveyors, one traveling stack conveyor and one shuttle conveyor for stockpiling. A modern control center is strategically located so that the superintendent can observe the entire plant. There is even provision for closed circuit TV surveillance if needed.

Automatic production calls for trouble-free equipment and that's why Deister Vibrating Screens are used throughout the Myers plant. There are eight Deisters in all — heavy-duty Type UHS models with one, two or three decks as required by the particular screening operation (see arrows).

Mr. Myers explains the decision to standardize on Deister this way: "We bought our first two Deister Screens in 1958 for use in our old plant. Both have run perfectly for two years, sometimes 16 hours a day, with no maintenance except for lubrication



The flexibility of Myers' system is demonstrated here at Station #3 where two double-deck Deister Screens operating in tandem are located over a 4-bin arrangement. Finished sizes from each bin can be fed to trucks, to any of four stockpiles, or to a crusher and thence to Station #4, a 100% crushed aggregates operation. Blended sizes can be routed in the same way.



GRAVEL PLANT RUNS ITSELF

plant operation

and cloth replacement. When it came time to build our new plant, Deister was the unanimous choice."

This endorsement is seconded by Plant Superintendent Alex Faulds. In addition to commenting on the trouble-free operation of Deister Screens, Mr. Faulds notes that it's much easier to change screen cloth on a Deister. "We can change cloth in less than half an hour during lunch periods without losing a minute of operating time."

Myers is one of hundreds of aggregate producers who have boosted output and cut maintenance costs with Deister Screens. Deister engineers welcome the opportunity to explain how your plant can reap the same benefits.

Robert C. Myers *(left)*, Secretary-Treasurer & General Manager, and Alex Faulds, Plant Superintendent, agree that Deister Screens outperform all other makes previously used by Myers.

DEISTER MACHINE CO.
1933 E. Wayne St., Ft. Wayne, Ind.

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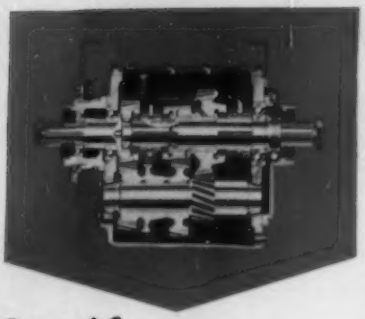

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MODEL

For medium-heavy duty trucks and tractors specify the

FULLER '65 SERIES

3-SPEED AUXILIARY

- High capacity
- Widest range of ratios
- Top-mounted power take-off optional
- Low initial cost, reduced maintenance
- Available from all truck manufacturers on specification

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(Medium-heavy-duty)
RATIOS

MODEL	SPLITTER RATIOS High	Intermediate	DEEP REDUCTION Low
3-A-65	.754	1.00	2.221
3-B-65	.804	1.00	1.239
3-C-65	.754	1.00	1.239
3-D-65	.804	1.00	2.221
3-E-65	.804	1.00	1.74
3-F-65	.754	1.00	1.74
3-G-65	1.00	1.32	2.221
3-H-65	1.00	1.32	1.74

Specify

Specify the MODEL

FULLER TRANSMISSION DIVISION
EATON MANUFACTURING COMPANY
KALAMAZOO, MICHIGAN

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CALENDAR

OF COMING EVENTS

1961

February 20-23, 1961—American Concrete Institute, 57th Annual Convention, Chase-Park Plaza Hotels, St. Louis

February 23-24, 1961—Expanded Clay & Shale Association, Annual Meeting, Sheraton-Jefferson Hotel, St. Louis, Mo.

Feb. 28-Mar. 2, 1961—American Institute of Mining, Metallurgical & Petroleum Engineers, Annual Meeting, Chase Hotel, St. Louis, Mo.

March 1-2, 1961—16th Annual Convention, Iowa Limestone Producers Association, Savery Hotel, Des Moines, Iowa

March 5-8, 1961—American Road Builders Association, 59th Annual Convention, Atlantic City, N.J.

March 30-April 1, 1961—Fourth Symposium on Rock Mechanics at the Department of Mining, Pennsylvania State University, University Park, Pa.

April 12-14, 1961—American Institute of Mining, Metallurgical & Petroleum Engineers, International Symposium on Agglomeration, Sheraton Hotel, Philadelphia, Pa.

April 18-20, 1961—American Institute of Electrical Engineers, Cement Industry Technical Conference, The Sheraton-Cadillac, Detroit, Mich.

April 24-25, 1961—American Institute of Mining & Metallurgical Engineers, Southwest Minerals Conference and National Meeting of the Industrial Minerals Section of the Society of Mining Engineers of AIME, Stardust Hotel, Las Vegas, Nevada

April 27-29, 1961—Texas Aggregates Association and Texas Ready Mixed Concrete Association, 7th Joint Annual Convention & Equipment Show, Robert Driscoll Hotel, Corpus Christi, Texas

May 11-13, 1961—National Lime Association, Annual Convention, Grand Hotel, Point Clear, Ala.

June 25-30, 1961—American Society for Testing Materials, 64th Annual Meeting, Chalfonte Haddon Hall, Atlantic City, New Jersey.

August 20-24, 1961—Semi-annual meeting, Board of Directors, National Sand and Gravel Association, The Greenbrier, White Sulphur Springs, W. Va.

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ONE high-speed CASE® W-5 does the work of two smaller rigs ...with up to $2000 less cost!

Sounds almost too good to be true! BUT comparative tests *prove* that, under normal loading conditions, *one* fast-cycling Case W-5 loader, with 1-cu yd high-dump bucket, will move as much pay-yardage per day as *two* smaller capacity outfits mounted on conventional wheel tractors. In addition to saving an *extra* operator, the more powerful W-5 can save you as much as $2000 in initial investment because: (1) it is engineered and built *specifically* for loading and stockpile work; (2) all major components — *including engine and transmission* — are quality-built by J. I. Case Company, instead of being purchased from "outside" sources.

70% more breakout ... plus better machine balance and *double-heat treated, high-clearance axles* enable the Case W-5 to outperform any similar machine in its capacity range ... without danger of axle failure. Rear-wheel power-steer, with short 10'4" turn radius, also insures greatly increased maneuverability.

See one in action ... call your nearby Case Industrial Dealer today for a free W-5 demonstration. Ask him about the convenient Case finance and lease plans, with seasonal skip-payment privileges. Or, *write J. I. Case Co., Dept. B1471, Racine, Wis.*, for details.

You pay less than $6700

For a full 1-cu yd loader with Torque-Converter Drive

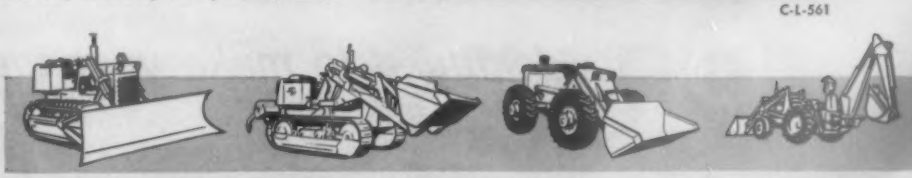
Complete F.O.B. factory, gasoline-powered model, plus freight and taxes. Slightly higher in Canada. Price subject to change.

You get...

a rugged 3000-lb capacity front-wheel-drive loader with 1-cu yd (SAE rated) bucket, 188-cu in. Case-built gasoline or diesel engine, torque-converter drive, forward-reverse power-shift, rear-wheel power-steer. Comes equipped with big 13.00 x 24, 8-ply drive tires, standard 7.50 x 16, 8-ply rear tires, 12-volt electrical system, front and rear lights, usual instruments. *Optional extra-cost equipment:* 1½-yd light material bucket, pallet fork, block fork, all-weather cab.

C-L-561

CASE®
J. I. CASE CO., RACINE, WIS.



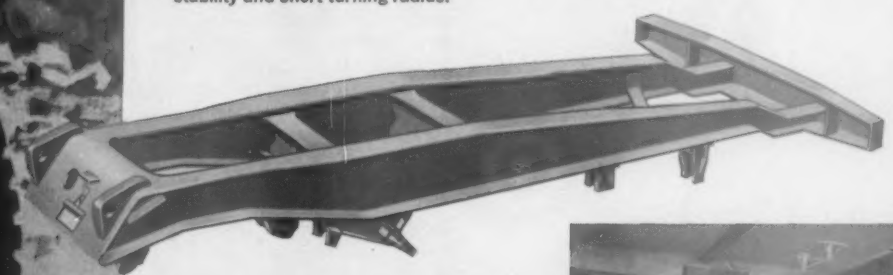
THE ADVANCE-DESIGN TRACTOR LINE... 12 MODELS... 50 EQUIPMENT COMBINATIONS

NEW... MACK 30-TONNER

...designed to make your tough jobs easier

Heaviest-duty Mack rear axle, combining hypoid carrier with Planidrivee, keeps M-30X hustling where others bog down. The new M-30X boasts one of the strongest, longest-lived rear axles of any four-wheel dumper in the field. Drive is through exclusive single-reduction hypoid Mack carrier, with planetary gears in wheel hubs. Suspension is by extra long, extra broad semi-elliptic progressive-rate leaf springs with cam-faced slipper ends and radius rods.

New tubular front axle withstands heavier loadings. Steel tubing, seven inches in diameter, with walls ¾" thick is welded to cast ends to provide a reversed Elliott front axle that withstands the most punishing loads of quarrying, construction or mining. Extra wide tread gives maximum stability and short turning radius.



Five-crossmember, alloy steel frame shrugs off jarring drop loads of big shovels. Typical of Mack off-highway truck construction practices, the frame of the M-30X Model is extra solid, extra strong. I-beam main rails are tied together by five welded crossmembers to prevent stress concentrations.

New, massive functional cab for easier truck handling . . . extra driver comfort. The M-30X cab is not only rugged, but completely functional. Offset design provides maximum vision for quicker spotting and dumping and safer operation. Forward position permits heavier loading of new set-back front axle.

Meet the new Mack four-wheel dumper chassis that meets the most challenging, rigorous, heavy-duty jobs in mining, quarrying and construction—the M Model 30-Ton Dumper.

Visually, the silhouette of the new M-30X exhibits efficient, modern lines that are unmistakably Mack from the new, spacious and functional cab to a rear axle that is one of the sturdiest and most trouble-free of any four-wheel dumper in the field.

Beneath visual ruggedness lie the time-proved features that have won Mack construction trucks worldwide fame for complete reliability and performance. In addition, there are many M Model exclusives that make it even more maneuverable, rugged, dependable and safe.

Sure to be first choice among those who must haul huge tonnages profitably, the M Model is ready for your most critical appraisal. See your Mack branch or distributor for the full story of its capabilities. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

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Structural steel substitutes

WHEN STRUCTURAL steel shapes were hard to get (long ago), rock products producers really used their ingenuity to find and use substitute materials. Used oil well casing was one of these substitutes that has now become almost standard in some parts of the country to support bins and towers.

A midwestern sand and gravel producer didn't have a source of this kind of tubing, but he was able to obtain quite a supply of lift truck parts. These he welded together to make tubular supports for conveyors. The supports are strong, sturdy and give particularly good service when one support is partly buried in deep piles.

"Dead-man" controls

QUITE A FEW rock products producers use rather small truck-loading bins, not because of the expense of large ones, but because they only need the small capacity. Then, it's a simple matter to change the size of material going through the bin.

We've noticed, though, that one-man operations sometimes have a little difficulty keeping these shipping bins full; sometimes there is a problem of getting them too full.

A western sand and gravel producer has developed a one-station push button control for each feeder under his surge pile. Then the feeder can only operate when a man has his finger on the button; once the man can gauge how much material he needs in the bin, it's a simple matter to work these "dead-man" controls.

A midwestern aggregates producer has quite a number of storage piles and truck shipping bins—too many for one man to control easily. The solution at this plant was to put one bin level control about midway in the bin. As the level of material falls below the switch, the switch starts the feeder and conveyor supplying the bin. Then when enough material flows into the bin to contact the switch again, the conveyors are stopped automatically.

Distributing conveyor

THIS CLIFF-HANGING vibrating screen and distributing conveyor caught our editor's eye recently at a southwestern aggregates producer's plant. The vibrating screen is used either to dedust the gravel or to scalp out oversize. The small conveyor perched on the concrete dividing wall throws the screen oversize into the middle of the next storage compartment.

Screen storage trailer

A WESTERN sand and gravel producer operated for years with only portable equipment. Then it was only logical that his supply of screen cloth be towed around with the portables on its own trailer.

But even after this producer had constructed a very sizeable processing plant in one location, he found that the portable screen inventory was exceedingly useful. A pickup truck or tractor shovel quickly moves the whole rig from one end of the plant to another—to any place that needs a new screen cloth. The sturdy pipe racks keep the screens in first class condition and hold the different sizes of cloth readily available.

(Continued on page 80)

Contributions? Of course

When we visit rock products plants in our travels we are frequently asked if contributions are accepted for Hints and Helps. The answer is—of course they are.

The editors in the field keep a sharp eye out for a producer's ingenious mechanical inventions but they cannot possibly notice every one. So, if you have a Hint and Help in your plant, feel free to send us a brief description along with a photo or sketch.

You will then have the satisfaction of helping producers in all parts of the country. And for your helpfulness, ROCK PRODUCTS will send you a crisp green check for $5.00.

CORHART 104 adds months to cement kiln hot zone life

THIS refractory is conventional in shape and dimensions, but different—*much different*—in all other characteristics.

In many respects, Corhart 104 is as tough as the diamonds we saw it with. It is chemically inert to all forms of cement clinker, including high alkali types. It attracts and stubbornly clings-to a uniform clinker coating through cold shutdowns and subsequent start-ups. Corhart 104 is far more dense and impermeable than *any* bonded basic brick.

Corhart 104 is formed by melting carefully controlled amounts of chrome ore and sea-water magnesite in an electric furnace at temperatures exceeding 4500°F. It *freezes* at 4200°F. The result is a rugged interlocking crystalline refractory structure with a 1000°F "margin for error" . . . and twice the life of conventional basic refractories.

Corhart 104 is being used extensively to balance hot zone life in cement, dolomite and other types of rotary kilns. Write for more details on this outstanding hot zone refractory: Corhart Refractories Company, Incorporated, 944 Commonwealth Bldg., Louisville 2, Kentucky.

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continued from page 78

Mobile equipment

A NUMBER of rock products producers have developed or purchased mobile tools that are scarcely larger than toys. The small size of the tools is no indication of their usefulness.

For example, several cement plants have purchased motor scooters. Maintenance men now rush to the scene of trouble in speed and style. With their personal, portable radio, they are then able to summon tools and specialized assistance. Sometimes these tools arrive on the scene in a three-wheel scooter fitted with a trunk or tool carrier. In this way, costly breakdowns can often be avoided—breakdowns that might easily offset the expense of the portable equipment.

Portable generators and man-size portable compressors are not yet common enough to be conventional. Yet quite a few producers who have them are finding that their judicious, well-planned use saves time and money.

Take-home pay isn't everything

"I AM GOING TO QUIT," said a workman to his quarry foreman, "Another company has offered me more pay than I am getting here."

"How much are they offering?" asked the foreman.

"Fifty-five dollars per week," replied the man. "I'm only getting $50 per week here."

The foreman sat down with the man and showed him that in reality he was making much more than $55 a week where he was, but perhaps did not realize that fact. He had not taken into consideration his several "fringe benefits"—the life insurance and the retirement policies the company was carrying for him.

The man had been with the company long enough so that he was receiving a 10 percent service bonus and vacation pay. His share of a production bonus amounted to more than an additional 10 percent. So, all together, he was making considerably more than he realized and much more than was actually offered by the other producer.

Needless to say, this man did not leave. His present company looked better to him after his talk with the foreman. Without doubt there would be much less quitting and shifting about if employes fully understood the full cash value of the benefits they now seem to take for granted.

W. F. Schaphorst, Newark, N.J.

More on used screen cloth

USED VIBRATING SCREEN cloth probably accumulates around most rock products plants faster than anything else. As a result, it has found more different and unusual uses than the proverbial bailing wire.

Walkways and platforms are so common that it is the rare producer who uses much of anything else. Of course, the high-carbon wire is slightly more difficult to weld. And, since it is quite springy, it may require extra supports or stiffeners.

A couple of western sand and gravel producers have come up with two novel applications. One uses old vibrating screen cloths to enclose a screw classifier. This is more than just a safety measure; it also prevents coarse gravel, tools or other debris from falling into the tub from the screens or walkways higher in the tower.

Another producer uses heavy-mesh screens at the ends of long chutes and above the feed end of vibrating screens. In this way, sudden surges of material are kept within bounds.

Can you "afford" your old machine?

MACHINERY in regular use can be considerably more costly than we suspect. As we see our machines doing their work for us day after day, we are satisfied even though we agree that a change would be useful.

A prominent producer had two machines driven from 120 hp. 585 rpm. motors which drove the machines at a speed of 119 rpm. through chain drives. One of these chain drives became so badly worn that it was found necessary to replace it.

The new drive operated very satisfactorily, and the sales engineer followed it up from time to time in the hope that he would be given an order for a second drive to replace the other chain drive. However, the president of the company appeared to be in no hurry. He informed the sales engineer that it would be a year or so before he would place an order for the second drive because he thought that the second chain drive was in good condition.

The sales engineer didn't relish the prospect of waiting a year, but what could he do? He then suggested that an electrician take some readings of both the old drive and of the new drive and make a comparison. The electrician found a difference of 32 amp. at 440 v. in favor of the new drive.

This indicated saving was so great that the president of the company thought the electrician had made a mistake, so he had the utility company check the readings. The power company obtained the same results. The president ordered the second drive.

On the basis of 3-ph. current, the savings would be in the range of 21 to 23¢ an hr. for 24 hr. a day. It can easily be shown that the saving amounted to about $1,700 a year.

It should be obvious that it can often pay, and pay well, to do some testing and checking on machinery to determine whether or not changes should be made. This raises the question: When does a machine become obsolete? The answer is: A machine becomes obsolete as soon as it will pay to replace it.

W. F. Schaphorst, Newark, N.J.

END

"Our ReoMatic Transmissions deliver when a stick-job can't,"

reports Robert Shaw of Clayco Concrete Co., Kansas City, Mo., in telling of Reo Transit-mixers with Allison Fully Automatic Transmissions

The day after a heavy rain is a day of opportunity to transit-mix operators. Contractors are anxious to get foundations and floors poured the moment the sun shines. Yet, stick-shift trucks bog down in the saturated ground surrounding most building projects.

"We can send our ReoMatic Reo mixers anywhere almost any time," Shaw says. "Even with 5½-yard loads – that's about 42,000 GVW—we can pull in and out again without a hitch after a heavy rain. It's this kind of service to customers that helps our business profits grow."

It's not only the owners who praise the ReoMatic transmission. It's popular with drivers, too, according to Clayco's veteran driver, Dale Emphenour:

"When you're backing a loaded 5-yard rig up a steep ramp, you want equipment that won't let you down," he says. "Our new ReoMatics are great in spots like this—up and down for another load much faster than stick-jobs. And when we're pouring curbs, the ReoMatics let us move at speeds to suit the men at the forms. This does away with lumping and gives you a better job."

Other potential savings, too, become a reality with the ReoMatic. With the torque-converter absorbing most of the shocks, axles, engines and drive lines are spared. Repair needs are fewer—overhaul needs farther apart.

For the full story, mail the coupon or see your truck dealer today.

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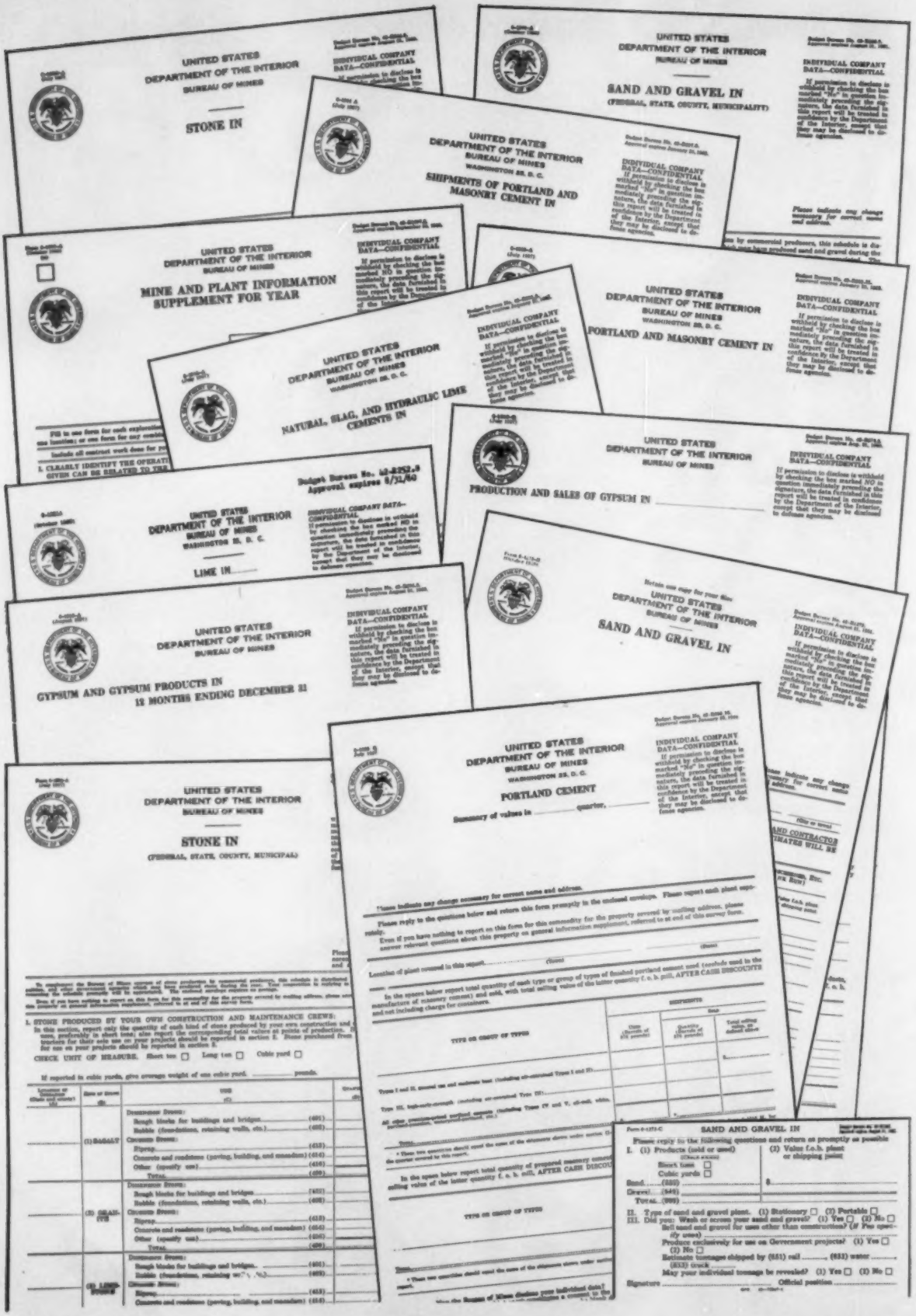
UNITED STATES
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SAND AND GRAVEL IN
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SHIPMENTS OF PORTLAND AND MASONRY CEMENT IN
MINE AND PLANT INFORMATION SUPPLEMENT FOR YEAR
NATURAL, SLAG, AND HYDRAULIC LIME CEMENTS IN
PORTLAND AND MASONRY CEMENT IN
PRODUCTION AND SALES OF GYPSUM IN
LIME IN
GYPSUM AND GYPSUM PRODUCTS IN
12 MONTHS ENDING DECEMBER 31
PORTLAND CEMENT
INDIVIDUAL COMPANY DATA—CONFIDENTIAL
SAND AND GRAVEL IN

ROCK PRODUCTS
February 1961

Rock products producers are torn between lack of good information and mazes of useless information

ARE INDUSTRY STATISTICS A BANE OR A BOON?

by Joseph N. Bell

ARE INDUSTRY STATISTICS a time-consuming, expensive pain-in-the-neck—or a virtually untapped source of valuable market information for nonmetallic minerals producers? Are the rock products industries being slighted by government and other statistic-gathering agencies—or is there entirely too much figure-tabulating already?

ROCK PRODUCTS asked these questions recently of government and trade association officials and individual producers. There is remarkably little accord in their answers. In the cross-section of opinion about the extent, value and most satisfactory source of statistics for the rock products industries, two basic facts stand clear:

(1) There is broad disparity in the nature and depth of the figures that the Bureau of Mines—the primary governmental fact-gathering body for minerals— collects for specific industries. The coal industry, for example, has available through the Bureau probably as good and detailed information as any industry covered by that agency, while segments of the rock products industry—comparable in many ways to the coal industry—receive relatively little statistical service.

(2) The amount and nature of statistics gathered for any particular segment of the minerals industries reflects rather directly the degree of aggressiveness and interest manifested by the industry. This, in turn, is dictated to a considerable extent by the use to which the figures are put by the individual members of the industry.

Let's take a closer look at the two contrasting examples cited above. Recent figures show there are about 8,300 active mines in the bituminous coal industry. Of that number, some 60 percent produce between 1,000 and 10,000 tons per year, accounting for only 4.7 percent of total bituminous coal production. At the other extreme, only 2.4 percent of the mines produce more than 500,000 tons yearly. Figures for the same year show a roughly similar pattern in size and distribution facilities in the sand and gravel industry.

Thus, we can legitimately ask: Why does the Bureau of Mines cover the coal industry so completely when the rock products industry gets so little? A simple check of data on coal included in the Bureau's Mineral Yearbook reveals that bituminous coal and lignite were allotted 80 pages for their 400 million tons of production. Even anthracite, which produces only about 20 million tons a year, was given 45 pages. By contrast, sand and gravel, which produces upwards of 700 million tons per year, was covered in a skimpy 20 pages. Obviously, there was much more detailed information on coal than on rock products.

Published testimony of hearings in Congress disclose that the Bureau of Mines has a budget of about $9 million a year for research projects, statistics and similar activities on behalf of the coal industry. The comparable figure for rock products is $2 million annually. Yet, our industry is at least four times larger in production tonnage, and its product value is nearly 50 percent greater.

It seems apparent that the rock products industry is being greatly slighted in proportion to its importance as a mining industry and its contribution to the national economy.

Why? There seems to be a strong reluctance in many of the rock products industries to put anything on paper for the general good. For example, a general questionnaire, which was sent out with the regular industry reporting form by the U. S.

Please turn page

STATISTICS—BANE OR BOON?

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Bureau of Mines last year, was received with a considerable lack of enthusiasm. The Bureau reports that it can consider for its program a wide variety of studies for any of the mineral industries when such studies are given interest and support from the industry involved. But for such surveys to be effective, the Bureau insists it must have more cooperation from many of the producers than it has had in the past. This factor, more than any other, has accounted for the disparity in statistic-gathering among comparable mineral industries by the Bureau.

Last year, the federal government made an effort to win over the minerals industries to the idea of an annual compilation of statistics to be gathered by the Bureau of the Census. Completion and return of the forms would have been mandatory; failure to do so would have put individual producers in conflict with federal law. The whole mining industry protested vigorously against such a plan, because it felt the move was not in the best interests of producers. And the proposal was junked, or at least tabled.

One industry spokesman told me "I've never heard any member of our industry say he would like to see the Bureau of Mines collect more information than it is now doing. But we certainly prefer the Bureau of Mines to the Census Bureau as a fact-gathering agency. The Bureau of Mines has standing in our industry that the Census people don't have. But, in general, we prefer to make our own surveys and feel competent to do the job without additional governmental help."

"I think we've reached and passed the saturation point on questionnaires," he continued. "No producer will ever say, 'I have all the information I want to get.' But I don't think we could ever arrive at that point, even if producers spent all their time filling out survey forms. In order to be useful, statistics should be compiled quickly. Our trade associations do this, and put them out in useable form many months before government statistics are available. We prefer to do it this way. Other industries do it their way."

There are two principal reasons for this attitude on the part of many members of the rock products industry. First, they consider the Bureau of Mines much better qualified to collect statistics in the minerals industries than the Bureau of the Census —and see no reason for bringing another agency into the picture at all. And second, they resist—in general and on principle—the whole idea of government collecting more statistics.

Thus, the crucial question becomes: Would it be to the advantage of individual rock products producers to have more and better statistics in the operation of their business?

The prevalent attitude toward statistics among most of our industry operators is to clutch the head and say, "Is this all they think I've got to do" —and throw away the questionnaire or survey form, regardless of where it is from or for what purpose it is intended. Much of this feeling is justified, because — without question — operators have been clobbered with far too many time-consuming questionnaires that they are asked to complete and return.

This attitude, though carried too far, leads to two unfortunate ends not in the best interests of the producer:

- He becomes so soured on statistics that he doesn't make maximum—or even partial—use of those easily available to him.
- He fails to discriminate among good, bad, and indifferent surveys—throwing them all out, regardless of their purpose or benefit to him.

If this is, indeed, the case, then the rock products producer can legitimately ask: "Of what possible good to me are the statistics gathered by national organizations, including the federal government?"

The question is a fair one and merits a better answer than the producer has received so far. He looks about him and sees himself as a local businessman in a restricted marketing area. "What advantage is there to me," he asks himself, "in knowing production figures or marketing problems in areas 2,000 miles from here?"

And finding no satisfactory answer, he throws away the questionnaire and turns to something of more immediate concern and benefit.

I asked this same question of Bureau of Mines officials, trade association executives and rock products operators who have found it worthwhile to cooperate in gathering industry statistics.

From their answers come six suggestions to the individual operator as to how he can better use the statistics being gathered about his industry:

1. Find out what is available in the way of statistics and get on the proper mailing lists. Producers fail even to mark an "X" indicating they want to receive a compilation of the figures to which they've been asked to contribute. The trade associations serving the industries and the nearest field office of the Bureau of Mines can tell you

the nature and extent of the statistics available for your use. You should at least know them.

2. Obtain the statistical data closest to your own geographic area. Again, many producers have the idea that statistics gathered by national organizations are purely national in scope and, therefore, too general to be usable. This isn't true. Figures are frequently broken down by region, and sometimes by local marketing area. True, this isn't done as often or in as much detail as the producer would like, but it is done more often than some producers seem aware.

3. Compare your own production figures with the sum of those of others in your shipping area. Thus, you can determine what your competition is doing—and what you can sensibly aim for.

4. Study the use pattern—all over the country—for your product. By discovering where other producers are selling, you can frequently find new markets for your own materials, and this applies in places far away from your immediate marketing area.

5. Study output per manhour. Your plant efficiency is significant. By statistical analysis, you can determine whether or not you're operating as efficiently as you could—and should.

6. Collect statistical ammunition to protect yourself, locally, and your industry, as a whole, from outside attack. This is probably one of the most important uses of statistical information. Producers are being harassed by people around them who don't understand the need for our nonmetallic minerals.

If a company is clearly able to show its detractors statistically what it contributes to the economy and progress of the area, it is in a much stronger position when it goes before a local zoning board. Or suppose a railroad jacks up its freight rates out of sight. The rock producer, his industry and his national association must have a sound statistical basis for a case to fight the increase before a public service commission. Our national associations use these data to excellent advantage.

Unfortunately, however, a rock products producer must be convinced of the usefulness of statistics before he will make any real effort to help in their collection.

"If a company has no interest in using statistics," a Bureau of Mines statistician told me sadly, "then it has little interest in reporting them."

This, undoubtedly, is the nubbin of the statistical problem. And it leads to a question that only individual industry members can answer: Is the improved collection of industry statistics important enough to justify an industry education program on the value of these statistics to the individual producer? For this is what would be required. Only a broad program of education could change some of the basic attitudes held by many smaller producers toward the collection and use of industry statistics. Yet, only by winning their cooperation can better statistics be gathered.

This is not to say that the agencies engaged in gathering statistical information are unfailingly efficient and unflinchingly dedicated to serving interested industries impartially, speedily and with maximum effectiveness. The statistic-gathering organizations also have some lessons to learn. By their own excesses, they have frequently antagonized and alienated the people whose cooperation they seek.

Sometimes, they:

—Send out far too many questionnaires, sometimes full of repetitions.

—Ask for information so detailed that it would take a great deal of time to dig it out.

—Duplicate effort (several agencies and groups will ask for identical information).

—Take far too long to compile the statistics. By the time some statistics are made available, they are so old as to be virtually useless to the recipient.

—Collect statistics without purpose. There should be a specific reason for requesting and assembling statistical information.

If these sins are to be corrected, the rock products industries affected must care enough to make some effort in this direction. A concerted effort on the part of all statistic-gathering organizations (including the trade magazines, which perform a useful function with their year-end industry forecasts) to combine and streamline requests, share information and process the figures quickly, probably could be arranged if the rock products industries were enough interested to force the issue. Otherwise, the situation will continue as much as it is today, with the same producers cooperating—and enjoying whatever statistical benefits can be drawn from the limited figures available.

How else can individual members of our industries help bring about better statistical coverage, particularly by the Bureau of Mines?

One method is to see or write your congressman and let him know there is interest and need for good and appropriate data. Be specific in what you ask for, what your needs are in the way of sta-

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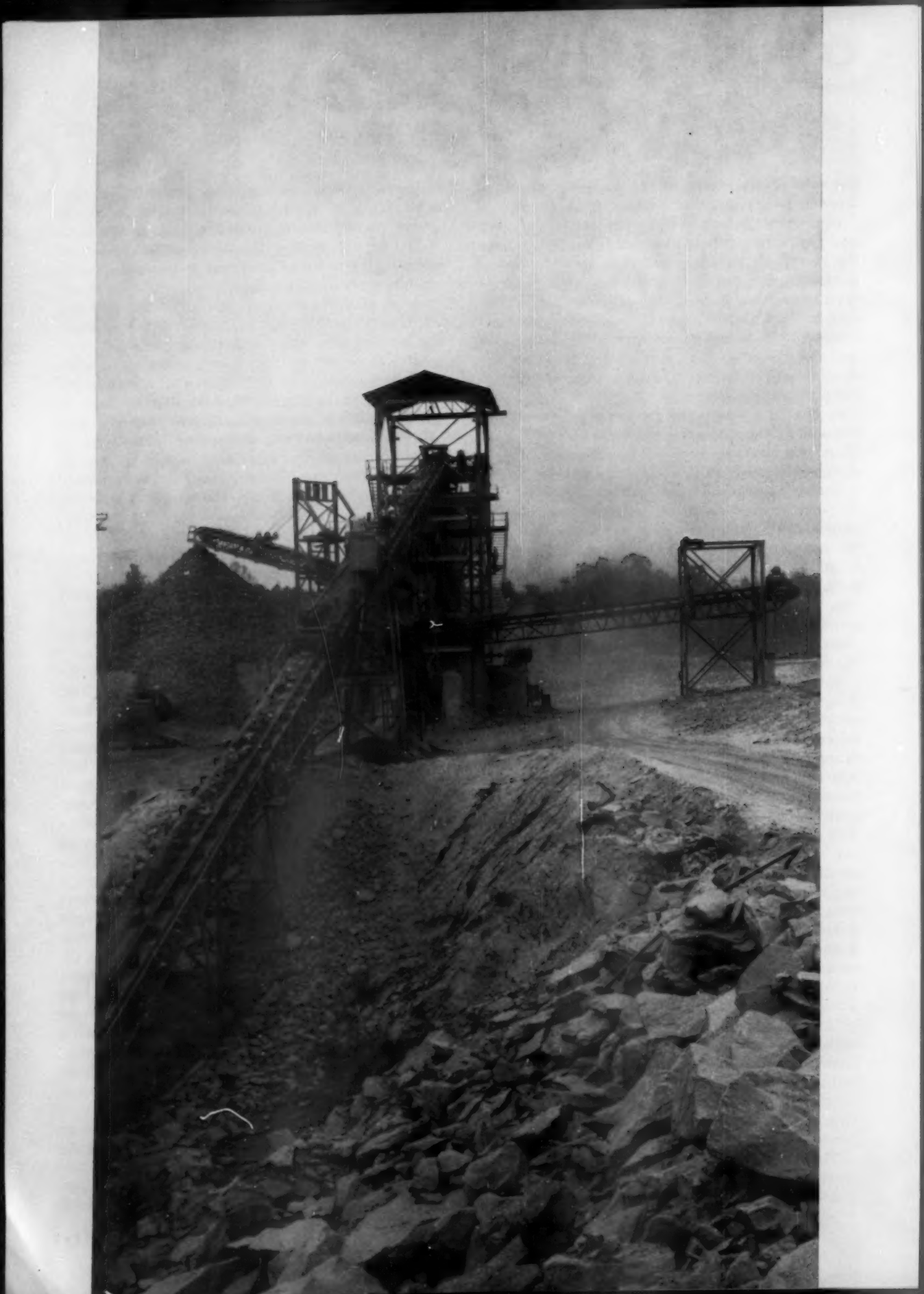

Stockbridge Stone's Barin plant moves granite aggregates into three booming southern states

Granite plant brackets Deep South markets

by Elwood Meschter

THREE SOUTHERN STATES are now served with granite aggregates from a new 500-tph. crushed stone plant at Columbus, Ga. There, Stockbridge Stone Div. of Vulcan Materials Co. spotted its Barin plant, a strategic place from which to ship aggregates into Alabama, Florida and southern Georgia. The new plant is on the Fall Line—southernmost outcrop of granite in the state—and at the western boundary of Georgia.

Columbus is the focus of a sizeable heavy-construction market in its own right. Several segments of the Interstate Highway Program will come within easy reach of the new plant. The Chatahoochee River basin development plan calls for a number of new concrete dams. Several are already under construction; others are in various stages of planning and design.

The needs of three states, Corps of Army Engineers and Interstate Highway engineers call for a wide range of aggregate sizes and gradations. The new plant has enough production flexibility to meet these specifications economically. Shipping flexibility permits the new plant to dispatch the aggregates rapidly once they are produced.

There is an almost limitless supply of granite at the Barin plant. Before the 200-acre tract was opened, it was core drilled to about 200 ft. without penetrating the ledge. Well drillers went down 500 ft. to reach water and were still in granite. This is a light gray, fine-grained granite that breaks down into sharp-edged cubes. Hard and abrasive, it is extremely destructive to chutes and crushers.

LEFT: Riprap and large aggregates are sized in the primary screening tower. They are shipped in rail cars over a boom, right, or put into storage with another boom conveyor, left

The new plant is geared for high-speed production and shipment of 11 standard sizes plus blends of these sizes. Washed aggregates can be shipped through the rail loading system individually or one or more sizes can be blended for shipment.

Rail cars may be loaded with washed or dry aggregates, individually or blended, at a rate of 275 to 300 tph.

Washed and blended aggregates are shipped by

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The Barin plant at Columbus, Ga., is the namesake of Clarence Aurelius Barinowski, Vulcan's genial, dignified vice president. However, he is known to his contemporaries around Birmingham, to the members of many national associations in the rock products industry, as "Baron." Mr. Barinowski has been with Birmingham Slag Co. since 1917 when he started as secretary to C. Eugene Ireland, sales manager of the company. Now he has the longest active service record of any officer or employe of this company. It was largely through his efforts that the partnership of Birmingham Slag and Lambert Bros. developed into the Stockbridge Stone Co. He is still active in three producer's associations—National Sand & Gravel Assn., National Crushed Stone Assn. and National Slag Assn.

BARIN GRANITE PLANT . . .

continued from page 87

truck from four bins under the washing screen.

Dry aggregates are shipped by truck from any one of six shipping bins to go to customers or into stockpiles.

Rail cars are loaded with riprap or other heavy rock directly from the primary scalping screen.

Rail cars may also be loaded with stockpiled materials over a truck dumping ramp.

The emphasis on rail shipment is purposeful. Perhaps as much as 90 percent of production is shipped by rail. Four sizes of aggregates are quite adequate to meet orders for concrete aggregates. For example, Corps of Army Engineers specifications call for 6 x 3-in., 3 x 1½-in., 1½ x ¾-in. and ¾ x ⅜-in. sizes. The largest size is taken directly from the primary scalping screen. The three smaller sizes are made from materials stored in a large surge pile.

Design capacity of the Barin plant was set at 500 tph. However, problems of quarry development have kept this figure closer to 435 tph. going into the processing system. Blocky rock is a problem faced by most granite producers. Even with the most careful drilling and blasting practices the rock does not break down easily into manageable sizes for the big 48 x 60-in. jaw crusher. A great deal of oversize rock must be fished out of the pile with the 4-yd. or two 2½-cu. yd. shovels that serve the quarry and pushed out of the haulage road with a big bulldozer. A dropball is kept busy making little ones out of big ones before this rock can be put into the processing system.

ONE OF THE TWO 2½-cubic yard shovels at work in the Barin plant's newly opened quarry

Once the granite gets to the truck dump hopper, it is fed to the massive jaw crusher with a 5 x 21-ft. manganese steel apron feeder. A cast manganese grizzly just under the discharge of the feeder lets fines bypass the crusher. These fines fall to the belt conveyor and cushion the impact of the torrent of crushed rock dropping out of the jaw crusher. In this way, the conveyor belt is protected from the impact of the sharp, heavy granite.

Two secondary crushers are needed to handle the volume of oversize dropping from a two-deck scalping screen. This oversize is split evenly between a 5½-ft. cone and a 30 x 42-in. jaw crusher, and they discharge to a common belt conveyor that returns crushed granite to the scalping screen.

When the scalping screen is sending 6 x 3-in. aggregates to the storage pile, both secondary crushers would not be needed. However, this heavy size accumulates so quickly that normal operation requires it to be recrushed and recycled. Otherwise the smaller crushers later in the system might be surged. Degradation of the large, sized aggregate is important so that the conveyor that takes it to storage is pivoted to be lowered to the top of the pile and raised as material builds up.

A second small scalping screen makes riprap or other heavy aggregates. Its screen plate can be changed to suit the minimum size specified, and the through-screen material drops to one of the two secondary crushers. Oversize flows to rail cars over a conveyor boom designed for just this purpose, and it can be raised to clear a locomotive and lowered to minimize breakage as rock flows into the car.

Fine aggregate production starts at the surge pile. There, three vibrating feeders put granite on an inclined belt conveyor leading to a vibrating screen in the tower above the third-stage crusher. At this point, the 3 x 1½-in. aggregate is taken off the lower deck of the double-deck screen and sent to finished storage over a steel tunnel. Oversize is chuted to the 4¼-ft. std. cone crusher to be recycled to the screen, while through-screen materials are conveyed to the next tower.

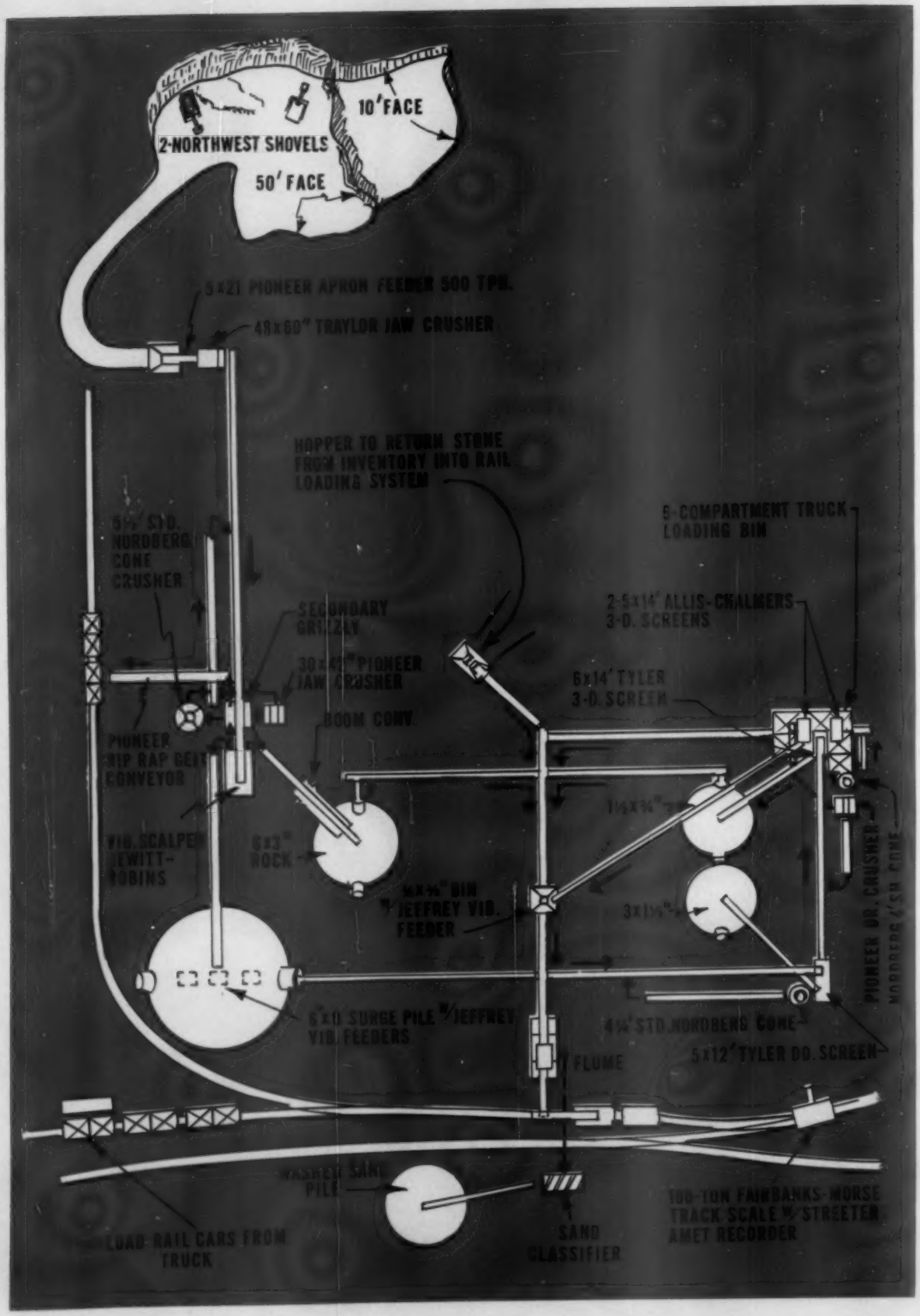
Three big vibrating screens achieve sizing accuracy and gradation control of the minus 1½-in. aggregates. Seven screen decks, a fourth and fifth stage crusher have plenty of flexibility. This gives the operator the opportunity to divert the stream

Please turn page

A MAN IN A CONTROL TOWER high above the plant supervises aggregate production. Tower in the background makes fine aggregates for rail shipment or for truck-loading bins

ABOVE: The heavy, gray granite is fed to primary jaw crusher with a manganese steel apron feeder

LEFT: Stone ladders for finished aggregates help to reduce breakage of the hard, sharp granite as it builds up in storage piles


10' FACE
2-NORTHWEST SHOVELS
50' FACE
5'x21' PIONEER APRON FEEDER 500 TPH.
48'x60" TRAYLOR JAW CRUSHER
HOPPER TO RETURN STONE FROM INVENTORY INTO RAIL LOADING SYSTEM
6-COMPARTMENT TRUCK LOADING BIN
5½' STD. NORDBERG CONE CRUSHER
SECONDARY GRIZZLY
2-5'x14' ALLIS-CHALMERS 3-D. SCREENS
30'x42" PIONEER JAW CRUSHER
6'x14' TYLER 3-D. SCREEN
BOOM CONV.
PIONEER RIP RAP BELT CONVEYOR
VIB. SCALPER JEWITT-ROBINS
6'x3" ROCK
1½'x¾"
¾"x3½" BIN ¾" JEFFREY VIB. FEEDER
3'x1½"
6'x10' SURGE PILE ¾" JEFFREY VIB. FEEDERS
4¼' STD. NORDBERG CONE
PIONEER GR. CRUSHER
NORDBERG 4¼' CONE
FLUME
5'x12' TYLER DD. SCREEN
WASHED SAND PILE
100-TON FAIRBANKS-MORSE TRACK SCALE ¾" STREETER AMET RECORDER
LOAD RAIL CARS FROM TRUCK
SAND CLASSIFIER

BARIN GRANITE PLANT . . .

continued from page 89

of materials from screens to bins to crushers to make sure that the finished products are "right down the middle" of any specification.

This virtually unlimited flexibility starts in the top of the tower where a 6 x 14-ft. three-deck vibrating screen takes the full flow of granite from the inclined belt conveyor. Material off the top deck can be sent to truck-loading bins, to a surge bin above a 4-ft. shorthead cone crusher or to a storage pile. Normally, this pile is built up with the product of the two lower decks, a 1½ x ¾-in. aggregate. However, this size can also be diverted to shipping bins or to the crushing circuit.

Through-screen products are divided between two, 5 x 14-ft. triple-deck vibrating screens, and the finished aggregates are distributed to the ¾ x ⅜-in. aggregate storage bin, to the cone crusher, six shipping bins, or to the 22 x 40 double-roll crusher that performs as a fifth-stage crusher. The crushed fines from this unit drop to the same belt that recycles material from the cone crusher.

The straightforward belt conveyor system was designed to blend the primary sizes of aggregates as they are drawn out of storage. Vibrating feeders under each of the three piles of finished aggregates can be operated to put material on collecting belts at a range from virtually a dribble to a rate better than 275 tph. The steel bin with the finest material has a single vibrating feeder to put material into the loadout system.

TRUCKS OR RAIL CARS are loaded with washed aggregates. As much as 90 percent of the plant's output is shipped by rail

Extra flexibility in the system lets a gate in the bottom of the crusher surge bin discharge to a belt conveyor system that ends up in the rail shipping system. Another auxiliary system lets trucks or front-end loaders put reclaimed stockpiled materials into the rail shipping setup.

Speed and flexibility are keynotes of the rail shipping system. Aggregates are brought to the top of a steel tower and discharged to a rinsing screen. This screen thoroughly tumbles the aggregates to strip off the dust; these fines are sluiced to a sand washing system. Normally, all aggregates are washed as they are loaded out, but the vibrating screen can be bypassed if the fines are needed in the finished aggregate.

A reversible shuttle conveyor picks up the washed granite and delivers it to the car-loading boom or to one of the four truck shipping bins under the tower. The boom is pivoted—lowered to minimize the drop between the end of the belt and the material in the car or raised to clear a locomotive.

Last stop of either rail car or truck going out of the plant is at the scale house. A 100-ton rail scale is fitted with a recording device to make a permanent record of the shipment. Trucks are weighed on a 50-ton scale.

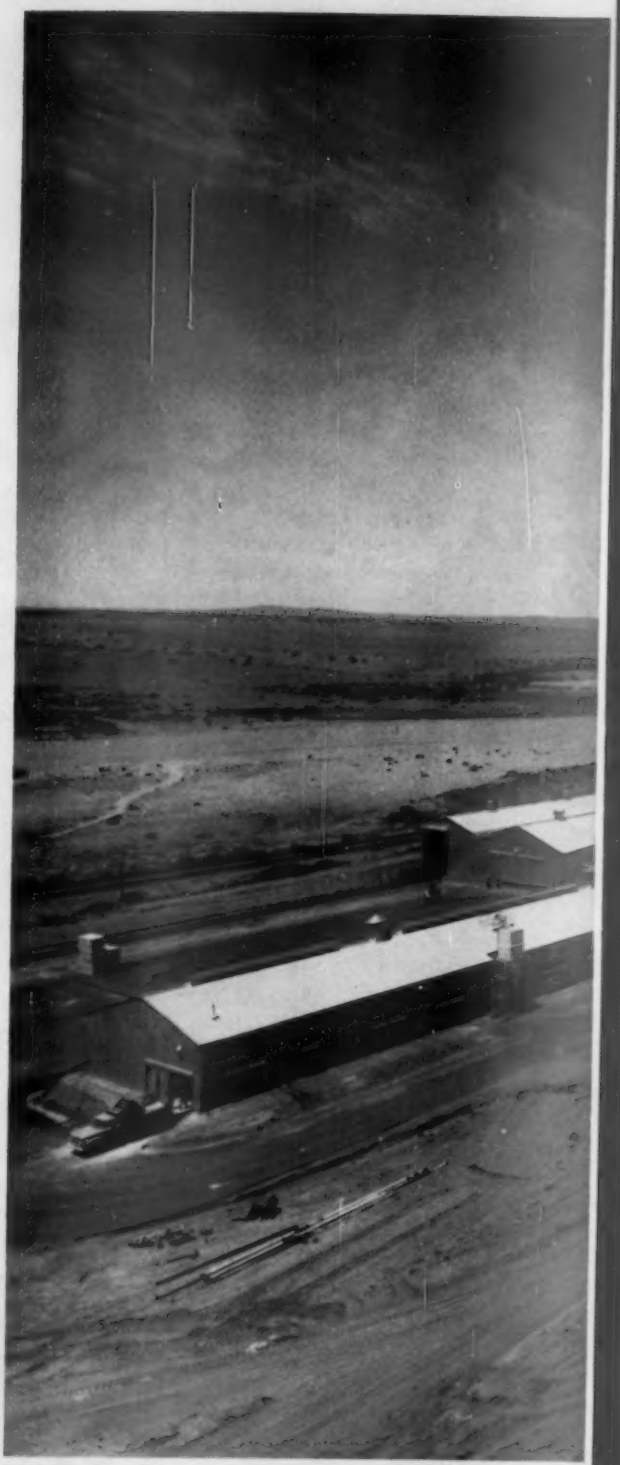
Granite sand is not an important product of the new plant. Tailings from the washing screen are taken to a single screw classifier that takes out the minus 100-mesh fines and sends them to a tailing pond. Finished sands are conveyed to a stockpile ready for shipment. END

MAJOR EQUIPMENT REFERENCE

Quarry trucks, 18-ton (4)	Euclid Div. GMC
Quarry truck (1)	Mack Trucks, Inc.
Quarry drills (2)	Ingersoll-Rand Co.
Compressors (2)	Ingersoll-Rand Co.
Quarry shovels (2) 2½-cu. yd.	Northwest Engineering Co.
(1) 4-cu. yd.	Harnischfeger Corp.
Belt conveyors (19)	Stephens-Adamson Mfg. Co.
Belt conveyor (1)	Pioneer Engr. Div.
Conveyor belts	Boston Woven Hose & Rubber Co.
Bulldozers, D8 (2)	Caterpillar Tractor Co.
Primary jaw crusher, 48 x 60-in.	Traylor Engr. & Mfg. Div.
Apron feeder, 5 x 21-ft.	Pioneer Engr. Div.
Secondary jaw crusher, 30 x 42-in.	Pioneer Engr. Div.
Fifth Stage roll crusher, 22 x 40	Pioneer Engr. Div.
Secondary cone crusher, 5½-ft. sh.	Nordberg Mfg. Co.
Third stage cone crusher, 4¼-ft. std.	Nordberg Mfg. Co.
Fourth stage cone crusher, 4-ft. sh.	Nordberg Mfg. Co.
Scalping screen, 4 x 6-ft. dd.	W. S. Tyler Co.
Vibrating screens (2)	W. S. Tyler Co.
Vibrating screens (2)	Smith Engineering Works Div.
Vibrating screens (2)	Allis-Chalmers Mfg. Co.
Vibrating feeders (6)	The Jeffrey Mfg. Co.
Truck scale, 50-ton	The Howe Scale Co.
Rail scale, 100-ton	Fairbanks-Morse & Co.
Rail scale recording device	Streeter-Ammet Co.
Design, layout and construction	Stockbridge Stone Div., Vulcan Materials Co.

Plateau of rock is ripped and stripped to supply raw materials for New Mexico board plant

Desert unfolds its gypsum lode



by John H. Bergstrom

ONE MAN, ONE DOZER, ONE SHIFT—that's all it takes to provide raw feed to Kaiser Gypsum's new gypsum board plant at Rosario, N.M. Surprising, isn't it, when you consider that the annual capacity of the plant is in excess of 125-million square feet?

With typical Kaiser ingenuity, a new idea for applying ripping to gypsum was conceived. It is now the key link in a quarrying system that is one of the most efficient and inexpensive in the nation. In an industry characterized for the most part by deep shafts, expensive mining methods and long shipping distances, this quarry arrangement is a dream come true.

The premiere use of ripping in the gypsum industry adds much to the low cost of production. Admittedly, it was a gamble—but one that has paid off handsomely. Like any innovation, it had its drawbacks; yet the potential savings were too big to be ignored. The greatest drawback was the possibility that the necessary degree of lateral fracturing could not be obtained, resulting in the production of far too many fines.

Here's how the balance sheet looked when weighing ripping against other quarrying methods. Equipment required to rip the necessary 300 tons a day of crusher feed is only one bulldozer rigged with a standard 24-in. ripper.

The best alternate method—shooting and dozing—would require the same size bulldozer, plus a

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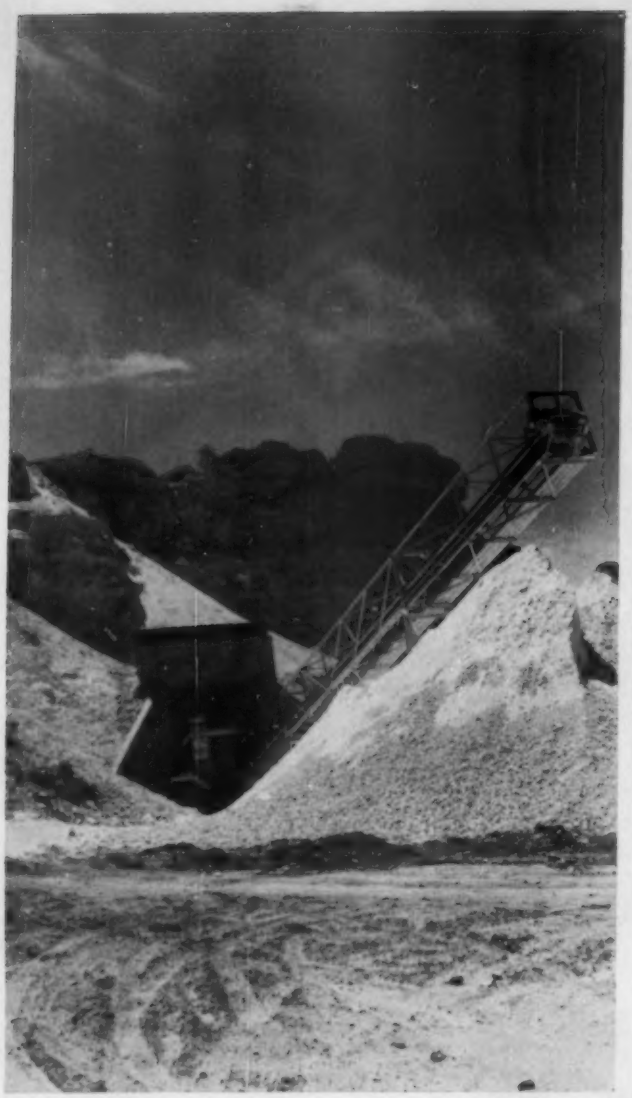
A RUGGED, ARID LANDSCAPE dominates Kaiser's new gypsum board plant at Rosario



LEFT: Raw gypsum is pushed over the rim of the cliff into the primary crusher. Stockpiled material is ready for drying and processing

ABOVE: Ripping and bulldozing has replaced conventional quarrying techniques at Rosario to produce well-broken gypsum for the new plant

RIGHT: Kaiser Gypsum's Rosario plant has opened up a vast new market for gypsum products—nearly 500,000 sq. mi. in New Mexico, Colorado and west Texas. At the same time, it has brought prosperity and steady employment to enthusiastic Indians from local pueblos

DESERT UNFOLDS ITS GYPSUM LODE

continued from page 93

drill and provision for explosives handling. Explosive storage facilities would have to be constructed, and probably an additional pickup truck provided to transport explosives and personnel. Hence, the saving in initial investment could be estimated at nearly $30,000.

But this was peanuts compared to operating, maintenance and labor savings. Although eliminating the cost of explosives and operating on two major equipment items was significant, reducing labor provided the big bonus.

Shooting and dozing would require at least three men. Ripping and dozing would need only one—a ⅔-reduction in labor costs.

"We didn't go ahead blindly," says Myron Read, assistant plant manager, who is in charge of quarrying operations. "First, we consulted a number of experts, including Kaiser engineers and plant designers. As an added precaution, we rented equipment and made a series of tests. Though not an unqualified success, results were promising enough to justify going ahead."

The topography of the deposit is a two-edged sword that both helps and hinders ripping operations. It covers over 50 acres of the plant's total area of 94, rising as a sheer cliff almost 110 ft. above the mill site. It is at the southern edge of the great sedimentary gypsum deposits covering a large part of northern New Mexico.

There is no overburden on the extremely pure gypsum. The seam itself, which is about 100 ft. thick, is canted toward the mill site at an angle of about 12 deg.—a big help in dozing material to the primary crusher at the base of the cliff.

But on the other side of the ledger, the working area was dotted with humps rising as high as 40 ft. above the general level of the quarry. These humps have made it difficult to prepare the large, level working area necessary for optimum ripping results. The original tests showed that if the terrain prevents the dozer operator from carefully controlling the set of the ripper, he is likely to do nothing but gouge a long furrow.

It took several months of experimenting to work out the best possible ripping pattern. Finally, a pattern of ripping and cross ripping was developed that seems to produce the best lateral fracturing with the fewest fines. Several types of rippers were tried. The most satisfactory proved to be a single straight shank ripper with a narrow point.

The dozer works only one shift to product the 300 tons of crusher feed necessary to sustain 24-hr. operation in the wallboard plant. After sufficient material is ripped, it is dozed over the cliff to the primary crusher. The ratio of ripping to dozing time is about 10 to 1.

Once the quarrying problem had been solved, raw material processing developed along conventional lines. The primary crusher is located at the base of the cliff about 600 ft. from the wallboard plant. Directly above the crusher is a concrete platform. Material from the quarry is dozed onto the platform and chuted to an apron feeder below. Dead piles of gypsum on either side of the platform, and a backstop on the platform itself, prevent material from going astray.

Arching above the feeder, an apron-type fabricated from a pair of dozer treads, could become a real problem. Because of this, great care is taken not to overload the feeder. As an ingenious design idea, a road gives the dozer access to the feed platform in the event of arching.

The primary crusher, a 30 x 50-in. single-roll unit, normally operates 2 hr. per day. Since reduction of large pieces of relatively soft gypsum is no problem in a unit of this type, no provision has been made to eliminate them.

Quarry feed is reduced by the primary crusher to minus 6-in. and conveyed by a 24-in. belt conveyor to a 4,000 ton stockpile. Enough space has been provided to increase the capacity of the stockpile to 10,000 tons if this should ever seem desirable. Feed for the secondary crusher is drawn from a reclaim tunnel below the stockpile.

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DESERT UNFOLDS ITS GYPSUM LODE

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INDIANS from two nearby pueblos operate the board line and dryer at Kaiser Gypsum's Rosario, N. M., plant

Another 24-in. conveyor carries material to the secondary crusher. Only one belt width is used throughout the plant. This lets Kaiser Gypsum standardize on conveyor parts and cut down on the amount of spares needed.

The hammermill used as a secondary crusher reduces the minus 6-in. feed from the stockpile to minus 1-in. at the rate of approximately 50 tph. Secondary and primary crushers are never operated at the same time so that only one man can control both units.

Although covered storage is not necessary in usually arid New Mexico, Kaiser had the foresight to provide for operation under any conditions. A 6 x 62-ft. rock drier has been installed to dry the feed to the secondary crusher during occasional wet spells. Natural gas is used to fire the drier, with a propane supply as a stand-by.

The secondary crusher works for about 3 hr. during each of the two shifts per day. This dual shift operation is dictated by the size of the storage bins for the crushed material. Total capacity of the two bins is only 175 tons.

Two modifications were made to the board machine before it was installed at Rosario. An inverter was added to the transfer table; the 250-ft. drier section was converted from steam to gas.

The calcining section contains three hammer-type impact mills that grind, calcine and classify the gypsum in one continuous operation. The use of impact mills, instead of the more common calcining kettles, allows continuous operation. Present plans call only for the production of wallboard. However, space has been provided for one calcining kettle in the event additional products are to be manufactured. Flow through the board plant follows the usual pattern. Although wallboard is the plant's only product, various sizes and types are manufactured for all marketing needs.

The Rosario plant is ideally located. It occupies a 94-acre site 2½ miles east of U. S. Highway 85, about 42 mi. north of Albuquerque and 20 mi. south of Santa Fe. It's Kaiser Gypsum's fourth gypsum products plant and its first significant move away from the West Coast. Wallboard from the Rosario plant will be marketed throughout New Mexico, Colorado, Texas and adjoining areas. This is a sales area of nearly 500,000 sq. mi.

The plant is also ideally located with respect to transportation and other utilities. It is built adjacent to the main line of the Santa Fe railroad, and only a 4,430-ft. spur was necessary to connect the plant's loading dock with the railroad. Both power and natural gas lines run along Highway 85 only 2½ mi. from the plant. Water is pumped from New Mexico's first gravel packed well to a 10,000-gal. storage tank.

Skilled labor was one thing the site didn't offer. Workers could have been transplanted from other company locations to insure plant start-up with little wasted motion. But this ran contrary to Kaiser's long-established policy of integrating all facilities into the local economy, including the use of local labor. Only a handful of supervisors were transferred from other installations—the rest of the plant force was hired locally.

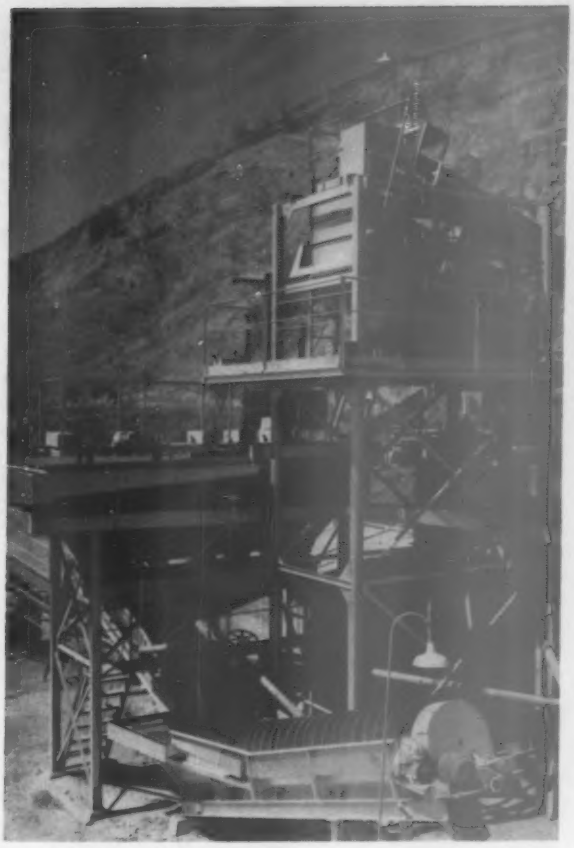
The closest neighbors of the relatively remote plant were three pueblos of the Santo Domingo and Coachete Indians. Although both tribes had long recognized the advantages of industrial employment, tribal ties are strong. Few cared to leave the tradition-rich culture of the ancient pueblos. Yet the opportunity for industrial employment close by brought a flood of applicants—with the hearty blessing of tribal leaders.

Of a total plant force of 100, nearly 75 percent come from the neighboring pueblos. "Naturally, many in our work force lack experience," says Plant Manager Don Sheppard, "but they make up for it in enthusiasm. They are learning quickly, and we have had no reason to regret our decision to make the greatest possible use of local labor resources in this area."

Centuries ago Santo Domingo Indian craftsmen fashioned the gypsum rock found near their pueblo into wampum used for trade and barter. Today, Santo Domingo craftsmen, with the aid of modern tools and techniques, again fashion the same gypsum into another product—one far more valuable to the growing Southwest. END

Here's how Henry Sand came out on top in his three-year controversy in California

Gravel producers *do* win zoning battles



SAND AND GRAVEL PROCESSING—screen, crusher and sand preparation equipment—is concentrated in a single structural steel tower

ZONING PROBLEMS bring out the tiger in even the most complacent citizen. This is particularly true in California's San Francisco Bay area with its matchless scenery and mushrooming suburbs.

Henry Sand, Sr., discovered this fact the hard way. In 1957 he applied to the Fremont Planning Commission for permission to renew his permit to operate his sand and gravel pit. The irate homeowners of this community some 30 miles southeast of San Francisco sounded the alarm. And almost before he knew he was in a scrap, Mr. Sand lost the first round of what was to be a three-year controversy.

Since he had nursed the project for nearly 30 yr., Mr. Sand was not one to give up at the first show of force. Already a veteran aggregates producer in 1931, he recognized the high quality of the deposit and the potential growth of the area. By 1951 he was able to purchase the property and immediately leased it to another producer for a 10-yr. term. This fact was to become a key point in the legal tussle that started when Mr. Sand regained control and attempted to go into business for himself.

There was never any question of his right to operate a sand and gravel installation there. Pit-run materials had been used by local farmers for county roads for nearly 80 yr., and the previous owners had worked off their taxes in this way. No rezoning was required. The area was zoned "rural," and gravel extraction would not be at odds with the designated uses for the area.

Battle lines were anchored on twin assertions. One, that the lessee had not worked the property during the term of the lease and, thus, had forfeited the right to work it; secondly, on the premise that sand and gravel plant would be a public nuisance.

Public indignation fixed on this idea, citing dust, noise, public safety and unsightliness as reasons for blocking the new plant. After his first set-back, Mr. Sand concentrated his efforts to refute these objections. His proposed new plant would be a small one and would produce washed products at that—practically no chance to make dust. It would be at least a mile away from the nearest picture windows and barely noticeable from a highway; unsightliness, noise and unsafe conditions would be highly improbable hazards.

Faced with obdurate commissioners and snappish citizens, he took the case to court. Here, it was determined that the lessee's inactivity was no fault of the owner and that the right to operate the property had not been abandoned. With the necessary permit still withheld, another round of

Please turn page

GRAVEL PRODUCERS DO WIN . . .

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court action was necessary before it could be extracted from the Planning Commission.

But the sparkling new 150-tph. plant fulfills none of its dire predictions. Design engineers took pains to make it as compact as possible without sacrificing processing efficiency. It is tucked under a hillside, out of sight and sound of the general public. Anyone who penetrated the area would find a showplace decked out in aluminum paint.

There is obvious pride in Mr. Sand's voice as he discusses the $200,000 operation and his plans for its future. His deposit has more than 3-million tons of high-quality sand and gravel and the Fremont area's rapid growth will make him expand to serve it. Now that his legal troubles are out of the way, Henry Sand, Sr., and his two sons, Henry, Jr., and Ronnie, can concentrate on aggregates production.

Material is bulldozed out of the side of the hill above the plant and pushed into a 25-yd. truck hopper. A reciprocating plate feeder under the truck hopper deposits pit-run material on a belt conveyor which moves it to a 4 x 12-ft. triple-deck washing screen. The top deck scalps off all plus 4-in. material and drops it into a bin from which it can be trucked to a waste pile. There is so little plus 4-in. material in the deposit that it would have been uneconomical to provide crushers or conveying equipment to handle it.

The 4 x 1½-in. oversize from the second deck is reduced by a 28-in. cone crusher and returned to the screen. The 1½ x ¼-in. size from the third deck goes to a scrubber which removes clay and silt. A 4-ft. trommel screen, which the Sands' fabricated themselves, is welded to the discharge end of the scrubber. It removes waste water and any fines that may still have been clinging to the gravel. The scrubbed gravel moves up a belt conveyor to a 3½ x 12-ft. double-deck screen mounted over three 100-ton truck loading bunkers. The screen normally makes three sizes for shipment: ⅜ x ¼-in., ¾ x ⅜-in. and ½ x ¾-in. A heavy-duty sand pump transports the waste water to a settling pond.

The sand which passed through the third deck of the main wash screen is chuted to a sand scalping tank. The scalping tank serves two functions: It classifies the sands, and removes excess water and slimes. Sands settle out in the tank with the

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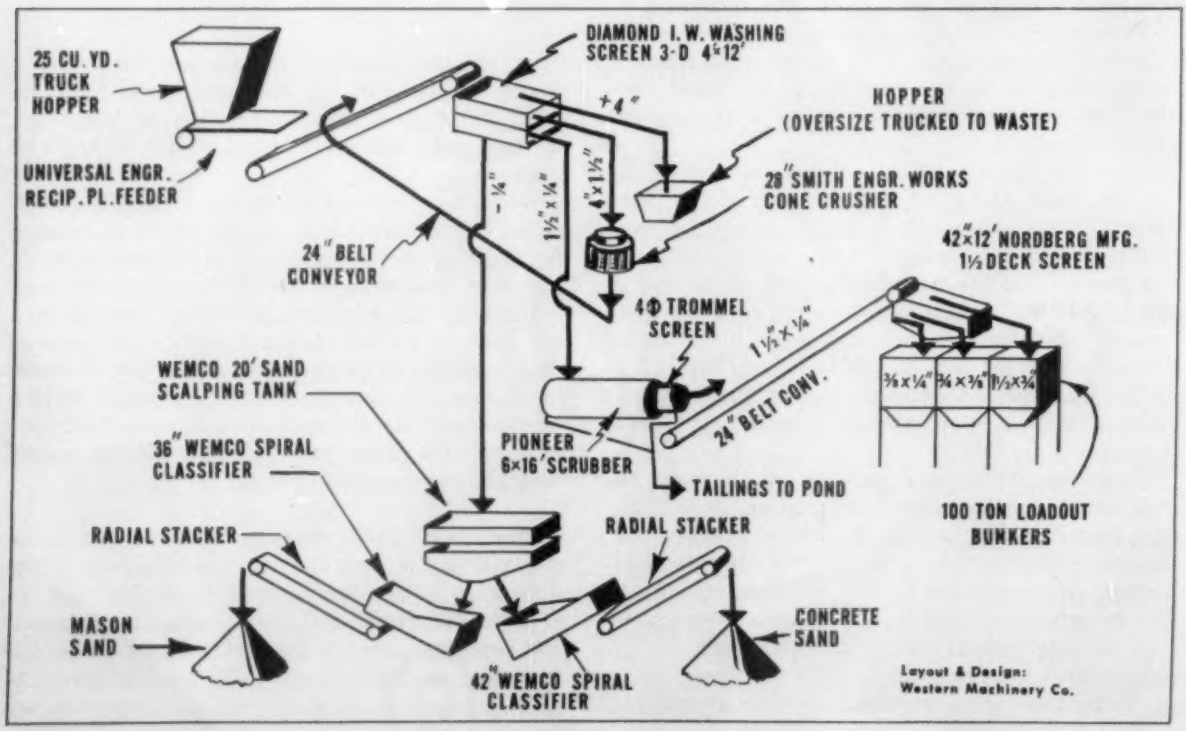

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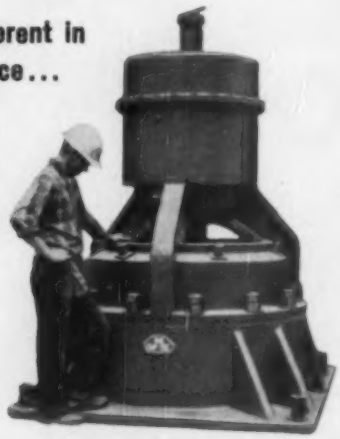
An announcement of

A new advanced design crusher for secondary and tertiary reduction is now available. It is the *KONE-O-MATIC*® and it is made by KENNEDY VAN SAUN, pioneer in the field of reduction crushing.

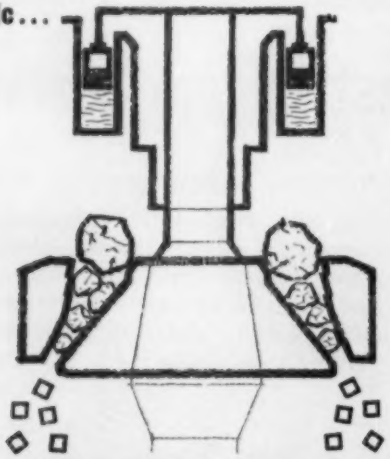
How is this new machine different from other crushers?

It is different in appearance...



It is low—lowest receiving opening—and, consequently, the purchaser of a *KONE-O-MATIC* obtains the maximum benefit from low design; buildings and conveying equipment are less costly; valuable space is conserved.

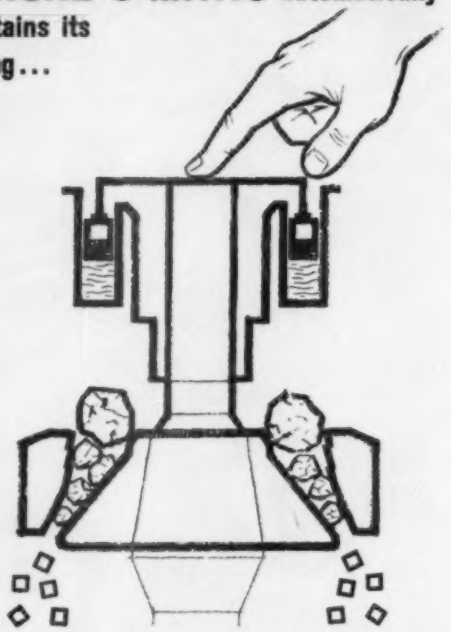
It is hydraulic...



It has the main shaft suspended from multiple hydraulic cylinders located above the spider—the logical location, not under the shaft in an inaccessible location.

Hydraulic crushers are not new, of course, but KENNEDY has carried the hydraulic idea to its logical next step.

The *KONE-O-MATIC automatically maintains its setting...**



This is the single most important development in crusher design since the introduction of the reduction crusher itself. We call it POSITROL. It is a device which sensitively "feels" the setting at which the crusher is operating and automatically corrects any variations from this setting. With other hydraulic crushers it is necessary for the operator to frequently readjust the setting to compensate for leakage of oil past the hydraulic piston.

POSITROL also permits tramp iron to be passed by the machine without damage, after which it returns to its setting hydraulically.

Adjustment of the *KONE-O-MATIC* for a new setting is simple and foolproof...

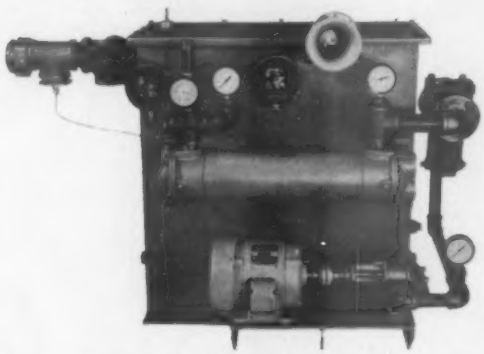
*(Patented & Patents Pending)

outstanding importance

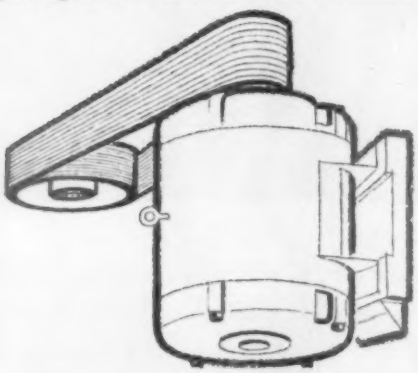
What's more it can be done while the machine continues to operate.

There are many other features of this remarkable new machine which make it unique:

It has a lubrication system of the most advanced design. Oil is forced under pressure through all vital points of the machine and is returned to the oil conditioning unit where it is filtered and cooled. For safety, an alarm is provided which instantly warns of low pressure or high temperature.



It has a gearless drive which is supported on roller bearings. More power is used for crushing —less for drive friction. There are no gears requiring lubrication and maintenance.



It has eccentric bearings equipped with renewable, precision-machined, non-score bronze liners.

It has a crushing mantle that is precision-machined for installation on the shaft without the use of zinc. Both mantle and bowl liner are ground to contour, permitting close adjustment.

This new advanced machine is now available in a complete range of sizes from 10 tons per hour to 1000 tons per hour.

For further technical particulars concerning the *KONE-O-MATIC* write for Bulletin KOM-61 or ask for a KVS representative to call.

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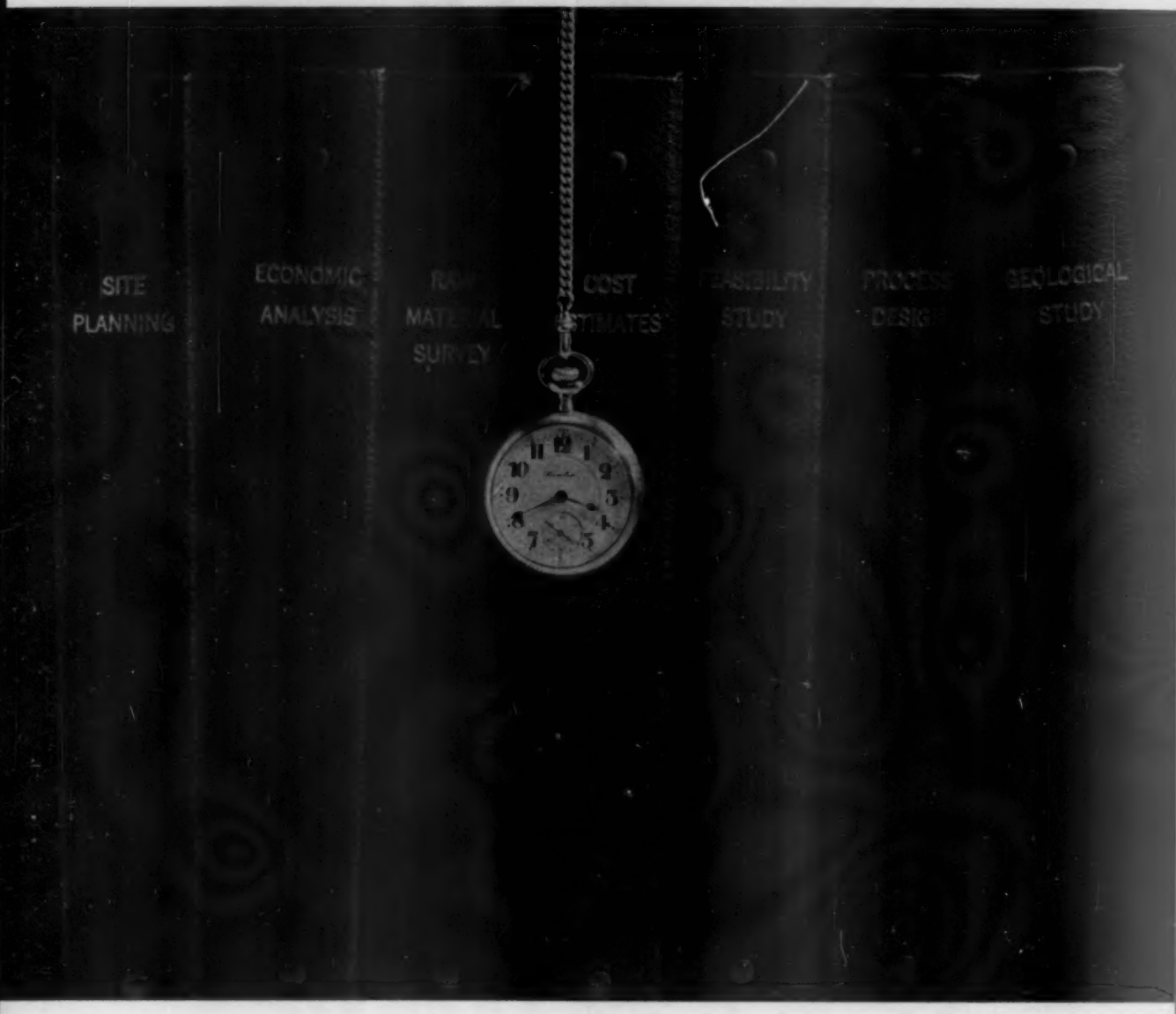
Pre-Engineering by KAISER ENGINEERS answers basic plant expansion questions...



Timely? Many complex factors shape the final decision to proceed with your expansion plans...and timing is an important one. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. The studies and evaluations furnished by KE Pre-Engineering represent only one phase of total KE services. Kaiser Engineers is an experienced designer and builder of all types of facilities for the Minerals industry. From Pre-Engineering through design and construction, Kaiser Engineers provides complete, one-company service and ingenuity based on years of experience.

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GRAVEL PRODUCERS DO WIN . . .

continued from page 98

larger particles nearer the discharge end of the tank. The tank retains sand as fine as 200-mesh.

As the sand builds up in the bottom of the tank, it actuates a valve control mechanism that automatically opens the valve to bleed off the accumulated sand. Each of the tank's six valves operate independently and a double flume under the tank receives the sand. Splitter gates under each valve allow precise blending of any specification product. Using a triple flume would allow the production of a third type of sand if desired. At the present time, concrete and plaster sand are the only products.

Concrete sand is further washed and de-watered in a 42-in. spiral classifier. The plaster sand is treated in an almost identical 36-in. unit. Swivel stackers convey both products to ground storage.

Initial investment had to be held to a minimum. Finding the right equipment required a great deal of patience and perserverance. But it paid off. As a cost-saving move, several used processing units were purchased. Equipment economies and further savings were achieved by doing all construction work themselves—a real accomplishment in these days of spiraling costs.

Because of the necessity of a low initial investment, storage and load-out facilities were not completed. Plans for the future call for to include 45-yd. load-out bunkers for handling sand. Eventually, all bins will be equipped with gates and conveyor systems to send aggregates to ground storage piles. END

MAJOR EQUIPMENT REFERENCE

Bulldozer	Caterpillar Tractor Co.
Reciprocating plate feeder	Universal Engr. Corp.
Vibrating screen, 4 x 12-ft. 3-d	Diamond Iron Works, Div. of Goodman Mfg. Co.
Vibrating screen, 3½-in. x 12-ft. dd	Nordberg Mfg. Co.
Cone crusher, 28-in.	Smith Engr. Works Div. of Barber-Greene Co.
Rotary scrubber, 6 x 16-ft.	Pioneer Engr. Co.
Spiral classifier, 42 & 36-in.	WEMCO, Div. of Western Machinery Co.
Sand scalping tank, 20-ft.	WEMCO, Div. of Western Machinery Co.
Front-end loader, 2½-cu. yd.	Mixermobile Mfgrs. Inc.
Conveyor idlers	Chain Belt Co.
Belt conveyors (3)	Western Machinery Co.
Radial stackers, 60-ft. (2)	Western Machinery Co.
Design & layout	Western Machinery Co.
Construction	Henry Sand & Sons.

ABOVE: Compactness describes Henry Sand's whole arrangement from truck dump hopper (right) to sand stackers (left)

ABOVE: Sized gravel preparation is an important part of the plant. It goes from a scrubber to a sizing screen over 3 shipping bins

RIGHT: Henry Sand's mountain of raw material looms above his plant. The flow of sand is split at the scalping tank. Concrete sand goes to a 42-in. spiral classifier (right); mason's sand to a 36-in. classifier (left)

Automatic system combines high and low-pressure lubrication to solve thorny maintenance problem

How to lubricate cement mill bearings

by George Wiley* & E. J. Klovers†

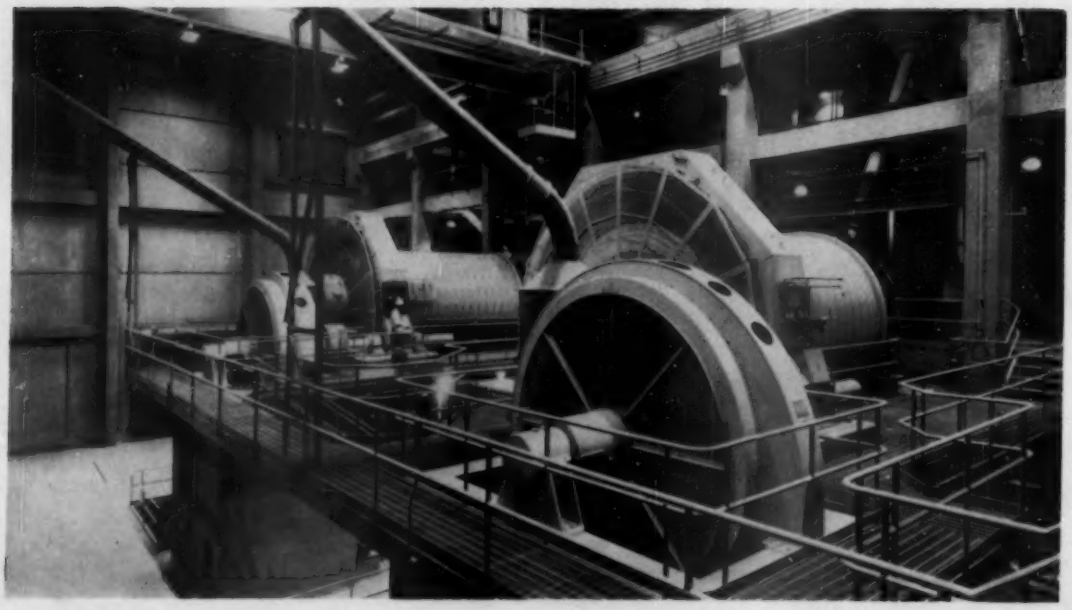
WE ARE USED TO MAMMOTH EQUIPMENT in the cement industry. But this is a field where machinery, already big, is getting bigger. In recent years we have seen the development of 2,500-hp. grinding mills, and larger, that dwarf the 1,000-hp. mills we formerly considered large. Looming up just as large are the factors responsible for their operating efficiencies. One of these developments—a very recent one—is a system of providing automatic, continuous, controlled lubrication to trunnion or pivoted-shoe bearings.

The first automatic units were made nearly two years ago and have been tried at Ideal's Houston, Texas, plant. Several months went into the final development of the lubricating system following an attempt at an automatic system at a midwestern cement plant. Engineers there had tried to use a high-pressure pump that would simultaneously float a mill and start it. They realized finally that

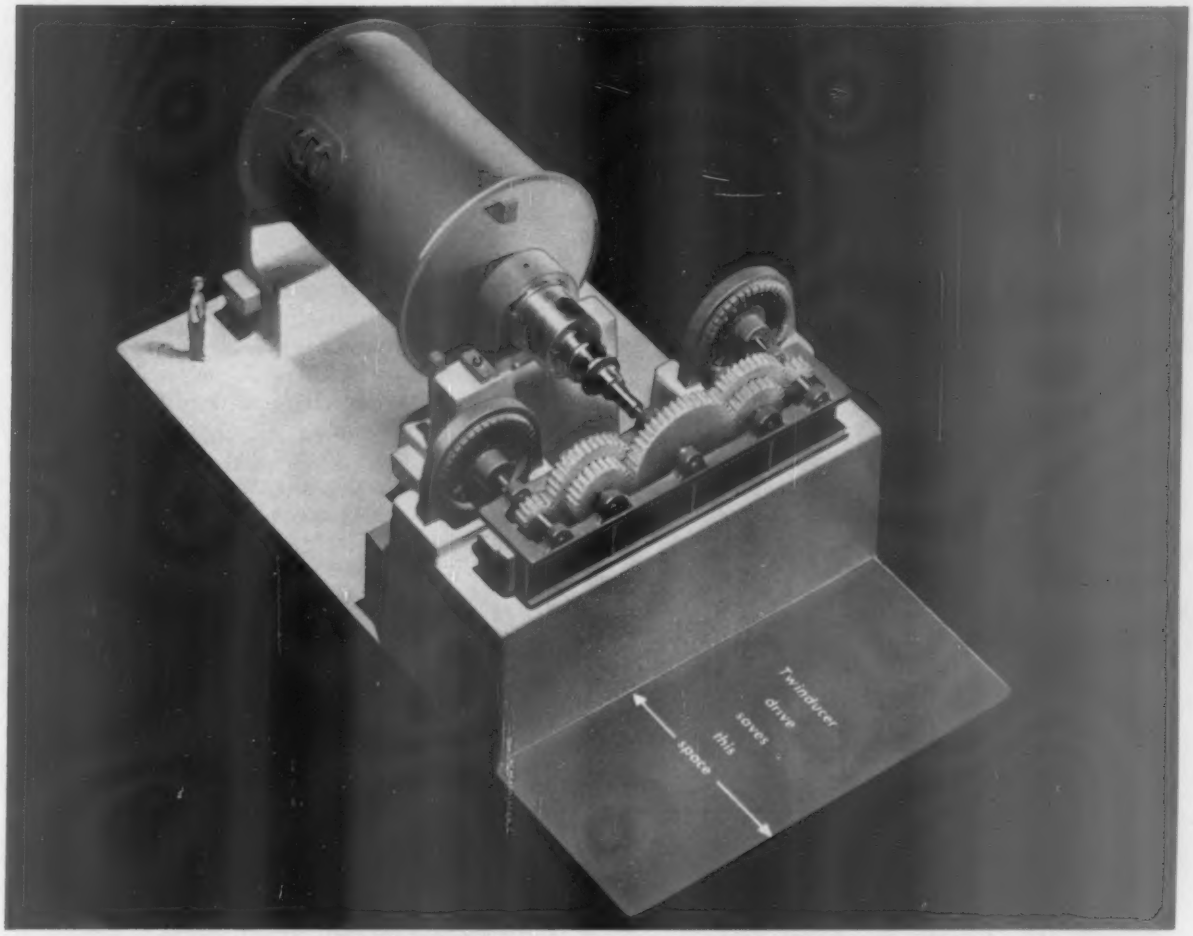
Please turn to page 106

*Chief engineer, Ideal Cement Co.
†Processing Machinery Dept., Allis-Chalmers Mfg. Co.

THESE 11½ x 17-ft. mills at Ideal's Tijeras plant are typical of the big mills that need a fully automatic lubrication system



ALLIS-CHALMERS



A 2000-hp Twinducer drive mill conserves up to 16 feet of space compared to other trunnion drive designs.

Twinducer drive saves on space and wear...

divides mill loads electrically

Another Allis-Chalmers first — *Twinducer* drive mill — creates new space savings, new long-range operating and maintenance economies.

Dynamic electrical load distribution is accomplished through rotor shift of one of the two motors. Once the load is balanced and the rotor locked in place, there is no need for further adjustment. No need for a floating gear or pinion, either, since electrical, not mechanical, balancing is employed with *Twinducer* drive.

Gears and pinions experience less wear because they are fixed. Wear is further reduced because the gear train runs in a filtered oil bath, promoting longer gear life through both splash and flood lubrication.

Twinducer drive efficiently harnesses the power of *two* synchronous motors located on the mill side of the drive. This unique, compact arrangement reduces drive dimensions drastically . . . as much as 16 feet on a 2000-hp drive.

Twinducer drive promotes better housekeeping, too. No lubricant leakage because the system is enclosed. No oversized foundations, no pits to collect waste materials and dirt.

Ask your A-C representative about the outstanding features of Twinducer drive mills. **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wis.*

Twinducer is an Allis-Chalmers trademark. A-1365

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HOW TO LUBRICATE CEMENT MILL BEARINGS

continued from page 104

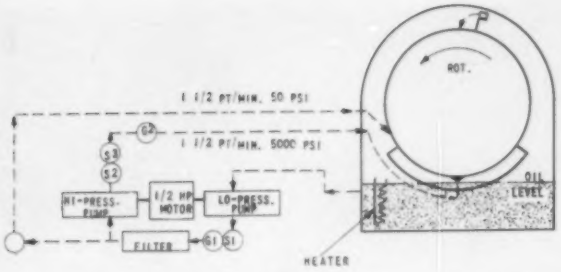


FIGURE 1—This automatic lubrication system combines both high and low-pressure systems. It operates when mill is idle as well as when it is running

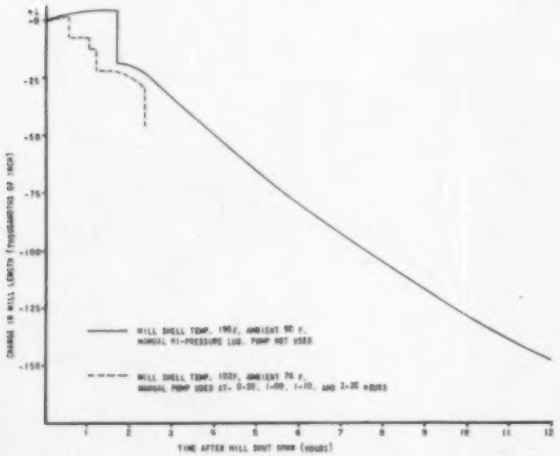


FIGURE 2—How a 23-ft. mill will change in length as it cools. Other big mills probably contract in much the same way and stress their bearing surfaces

the high-pressure system would have to be redeveloped in conjunction with a low-pressure circulating system.

With this system, lubrication is provided not only while the mill is starting and while it is operating, but also while it is idle. As illustrated in Fig. 1, it combines high and low-pressure systems, completely controlled and automatic.

In the testing period at Houston, we discovered the continuous operation of the system to have these main advantages: pure, filtered oil at all times; continuous supply of cool lubricant, but not under about 80 deg. F.; avoidance of sliding between mill and trunnions during the cooling-off period; low power expenditure; no need for elaborate interlocking and timing devices; no need to stop the mill while stopping and servicing the system; less checking and minimum connecting piping.

This new system succeeds an earlier type of lubrication procedure which has been used with good results on mills up to and including the 1,500-hp. size. It combined a self-contained, internal lubricating system with a manually operated, high-pressure system to be used prior to starting the mill.

By vigorously stroking the manual high-pressure pump, an operator can inject 15 to 25 oz. per min. of lubricant into the bearing directly beneath the trunnion to literally float it. Lift varies from .002 to .009 in., according to an indicator that reads the vertical movement of the trunnion. Exact amount of lift depends on the quantity of oil pumped, its viscosity and the fit between the trunnion and its bearing.

Combining the self-contained system and manual system is good and entirely adequate if the following conditions are met: (1) Operating personnel must religiously employ the manual high-pressure pump every time the mill is started. The pump should be used continuously about 15 sec. before and 15 sec. after the mill begins to roll. (2) The bearing oil reservoir must be held to the proper level. (3) Oil in the reservoir must be kept free of contaminants.

A year or two ago, we realized that yet another condition must be met: a stationary mill must be able to cool and contract without restriction.

On a comparatively long mill, so much heat is generated during grinding that the mill will actually "grow" as much as ¾ in. in length. The trunnion bearing opposite the gear end is designed to accommodate this mill growth while the mill is rotating. However, when a hot mill is shut down, it must cool and contract about this same amount. If this contraction occurs between a dry bearing and its trunnion, bearing distress may occur. Shell length contraction must then be resisted by the bearing piers, and this resistance will be reflected as a bending stress in the pier.

Fig. 2 represents data on changes in mill length as a 23-ft.-long mill contracts during cooling. A high-film-strength oil will minimize distress due to cooling, but the surest way to eliminate any bearing or pier trouble is use of high-pressure pumps periodically to float the mill during the cooling-off period. Most operators don't seem to recognize this necessity; nor can they afford the time to make the rounds to float the mill during this critical period.

A rudimentary low-pressure recirculating system is shown in Fig. 3. Essentially, it is a motor-

Please turn to page 108

Here's why you cut your cost/ton specified with *LIPPMANN* vibrating screens

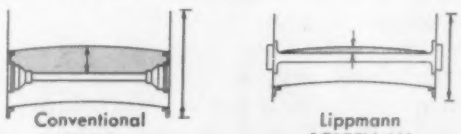
You get sharper sizing action since the entire weight of vibrating body is carried by the shaft. This allows a truly perfect-circle throw, without need for vibration dampening guy cables and springs. And results in maximum tumbling action, greatest particle contact for highest screen efficiency.

You get longer life with lower maintenance costs with SCREEN-ALL hub-mounted bearings. This design feature reduces shaft bending moment to a fraction of that of conventional screens, and permits larger bearing surfaces than on other screens of comparable rating. Further, eccentric hub permits perfect counterbalancing so no fatiguing strains and stresses are transmitted to screen frame.

Shaft bending moment of conventional screen

Shaft bending moment of Lippmann SCREEN-ALL

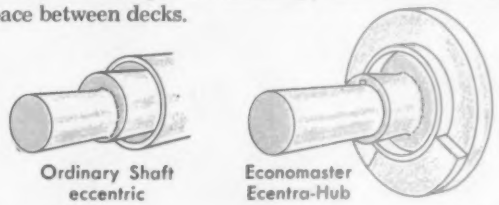
You need less head room. Conventional shaft-mounting wastes space. On SCREEN-ALL, *all four* bearings are mounted *outside* screen body. This permits shaft to be moved up to 8″ closer to deck . . . without any sacrifice of material flow.



Conventional screen

Lippmann SCREEN-ALL

Now, for the first time you can adjust the eccentric throw of a two-bearing screen . . . to compensate for load conditions. With exclusive Ecentra-Hub, eccentric weights are no longer fixed within the shaft, but are now placed on the hub assembly where they are fully adjustable. As a result you get an eccentric action which actually creates throw, and allows you to maintain high screening efficiency over a wide variety of conditions. Also, design permits a two-bearing screen with a uniform cross-section shaft for greater reliability and economy, and far less dead space between decks.



Ordinary Shaft eccentric

Economaster Ecentra-Hub

You get two-way, production-boosting tumbling action. Efficient circular throw, plus action of gravity on inclined screen impart a live tumbling action that gives maximum screen contact to all sides of particles . . . especially important with "slabby" materials.

Lippmann inclined screen with circular throw

Straight line throw of horizontal screens

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Yes, Lippmann makes horizontal screens, too!

Clip and mail for facts . . . Address to:
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Please send me details on how I can boost production and cut my screening costs.

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L-S-1-61

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continued from page 106

ized pump and filter, although refinements often include a cooler, heater, flow-metering valves and pressure switches. This system, when used in conjunction with the manual high-pressure system, is capable of adequate bearing protection during starting, running and cooling-off periods. However, operation of the high-pressure pump remains non-automatic.

About two years ago, as we mentioned earlier, a motorized high-pressure pump was placed in operation at a midwestern cement plant. The pump was used within a system similar to the one shown in Fig. 4. This lubricating system was developed so that a single operator, by means of push-button control, could simultaneously float the mill and start it. It was intended that the pump motor be interlocked electrically with the mill motor, so that the pump motor would run 15 sec. before the mill motor started and until the synchronous mill motor was in step.

But this elementary motorized system required frequent inspection of the bearing reservoir to assure the proper oil level. Actually, the motorized unit forces in a considerable quantity of oil if run frequently or for too long a period, and it is necessary to drain the excess oil. If this is not done, the oil usually leaks through the bearing seals and makes an unsightly picture against the piers or on the floor. This system had no pressure switches and it was necessary to check the gauges frequently and to inspect all lines for ruptures or kinks.

The system could have been modified to permit the mill to shrink during cooling-off by the use of a timing device which would periodically start and stop the high-pressure pump motor after the mill had stopped. However, the timing arrangement would not be practical, since the total quantity of oil delivered to the bearing during a week of "up-and-down" operation might be considerable.

The motorized high-pressure pump system was never developed beyond this stage, for it became apparent that it was to be redeveloped in conjunction with the low-pressure lubricant recirculating system.

A completely automatic system was developed after thorough testing in the laboratory. It has been evaluated by Ideal Cement Co. under actual operating conditions. It combines high and low-pressure systems, completely controlled and automatic. Here's how it operates: About 3 pt. per min. of oil are drawn from the bearing reservoir and returned via two channels. About 1½ pt. is put

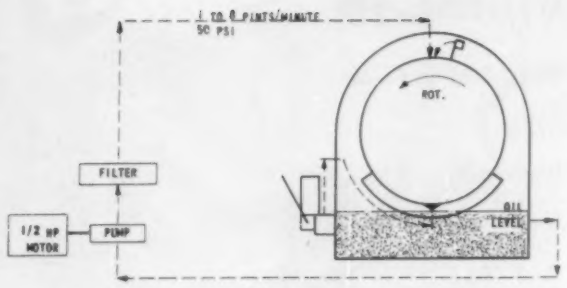

FIGURE 3—This is just about the simplest method of lubricating mill bearings

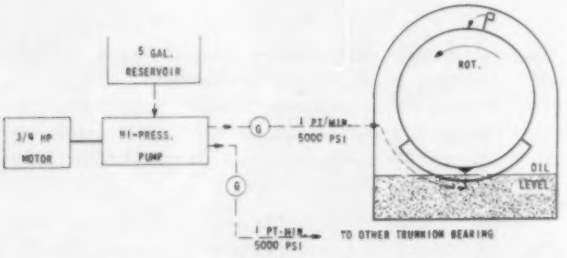

FIGURE 4—One of the simplest ways to include push-button control of bearing lubrication is to add an oil pump and interlock it with the mill motor

under high pressure directly below the trunnion, the other half is delivered to the top of the trunnion. The pump delivering the high-pressure oil is capable of pressures as high as 5,000 psi., but in practice it was found that 3,000 psi. or less is usually sufficient to keep the trunnion floated.

The 1½ pt. per min. of low-pressure oil is deposited either at the top of the trunnion or at the incoming chamfer of the bearing. This low-pressure oil and that oil which is brought up by the internal bucket system is pulled into the bearing as hydrodynamic wedge once the trunnion has been rotated.

Each bearing requires one complete system, including one ½-hp. motor directly coupled to the low-pressure and high-pressure pumps. Only a fraction of this horsepower is required for operation once the trunnion is floated and even less when it is floated and rotating. Because of the small expenditure of horsepower, there is no reason to stop the system at any time.

Actually, it is advantageous to allow this system to operate continuously. You may wish to check these advantages which we mentioned briefly above:

Please turn to page 122

NOW

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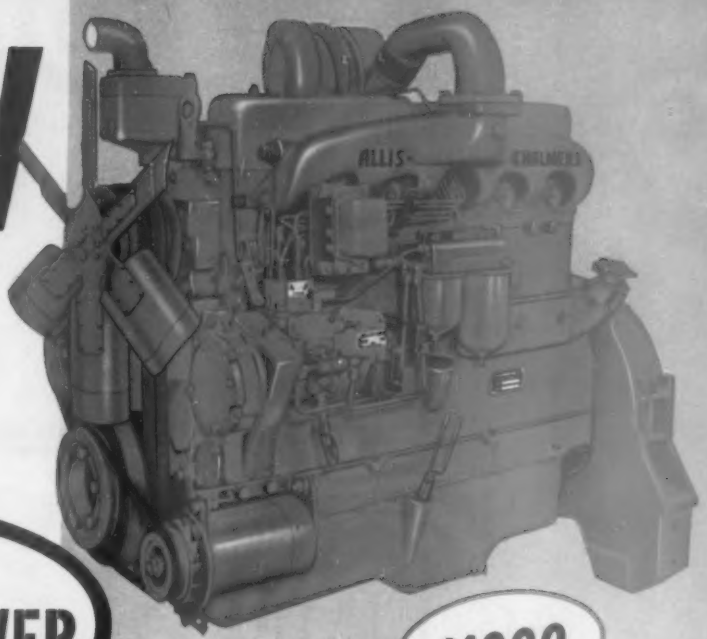
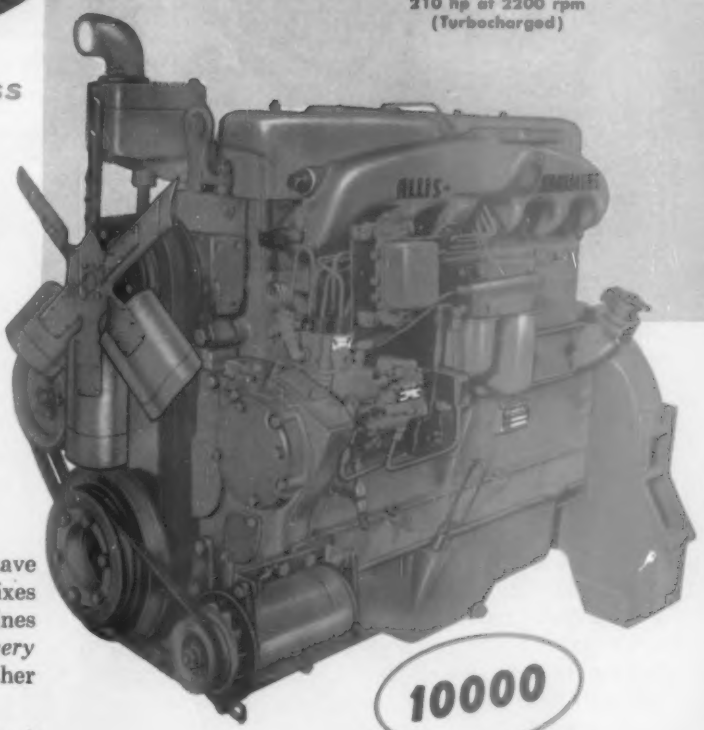
WORK POWER

in the 145—210 hp class



11000

210 hp at 2200 rpm
(Turbocharged)



10000

145 hp at 2200 rpm

Nowhere is there anything like these two great new Allis-Chalmers diesels—nothing compares with them in their range!

Real Work Power — The 210 hp in the turbocharged 11000 and 145 hp in the 10000 is down-to-earth power you can use — *work* power to operate smoothly under extreme load conditions.

High, Sustained Torque gives you work power throughout the entire operating speed range — power that really hangs on.

Great Fuel Economy — These new diesels have a unique combustion system that thoroughly mixes fuel and air for complete combustion. These engines run so efficiently that they work *extra hours every day* on the same amount of fuel used by other diesels in their range.

Clean Exhaust is another result of efficient fuel utilization in the 11000 and 10000 diesels. Fuel goes *out* in horsepower — not *up* in smoke!

Fastest Starting diesels in their class. They start without ether or pre-heating, even in freezing temperatures.

Find out more about what this new kind of work power can do for you. See your Allis-Chalmers dealer. Ask for new Bulletin BU-718. BE-23

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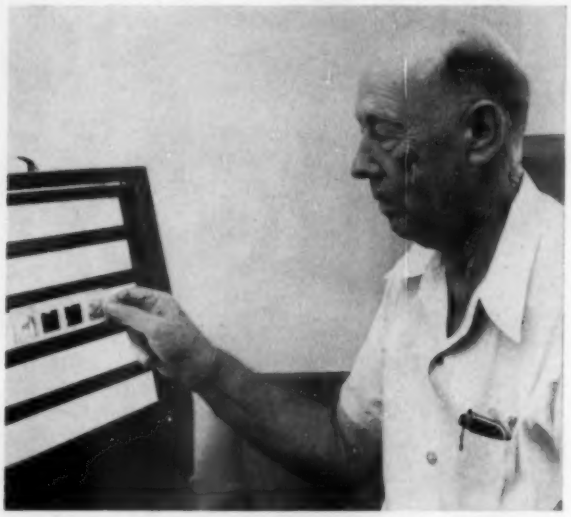
POWER FOR A GROWING WORLD

A-C ALLIS-CHALMERS

Texas Agricultural Limestone Association reaps rich returns from well-planned promotion programs

PUBLICITY SELLS AG-LIME

by A. B. Kennerly



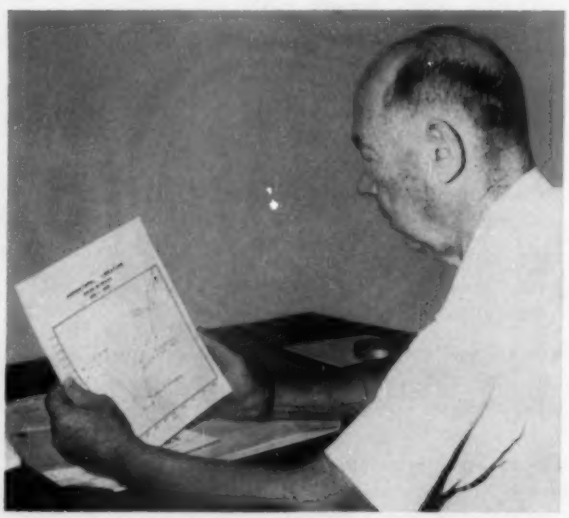
M. K. THORNTON, executive director of the Texas Agricultural Limestone Association, checks some color slides he plans to use at an educational meeting. This is one of the ways of showing farmers how they can increase yields through the use of limestone

THE EARLY 1950's were dreary years for agricultural limestone sales in Texas. By 1954, sales had dropped to 25,000 tons. That was the year the Texas Agricultural Limestone Association was organized. So successful was this move that sales had climbed to 72,000 tons by the end of 1955 and have gradually been increasing each year to the tune of 167,000 tons in 1959.

What has caused the amazing growth in sales? "We believe that much of the credit goes to the Association," says M. K. Thornton, now executive director for the Association. "It has only one purpose. That is to promote the use of agricultural limestone." But in actual practice the merchandising program isn't that simple.

"We develop sales through any educational or informational medium we can use," Mr. Thornton points out. "Right now, we're working on fair exhibits. We've had requests from limestone spreaders to enter five fairs this year—two of them coming on the same dates. That's why we're building two exhibits. They will be portable, easily moved from one fair to the other."

Comparative tests on the same farm is the central idea which Mr. Thornton uses to sell farmers on the idea of using lime. "Somewhere you can always find an unlimed pasture that is better than a limed one," Thornton reminds us. "That doesn't prove a thing. But when a farmer sees the difference on his own farm in crops where lime is used, then you've sold him on the idea—and you've sold his neighbors, too."



DIRECTOR THORNTON looks at a chart showing the increase in sales of limestone for the past few years

Mr. Thornton uses the method advocated by Texas A & M College extension people. They have learned that demonstrations convince farm and ranch families to adopt new practices. The idea works, too.

Please turn to page 112

From talc-like pulverants . . . to granulars . . .

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This wonderfully simple pneumatic hauler will unload a vast range of dry flowables with unusual efficiency. It's called Butler "P-D" (for pressure differential) and it absolutely thrives on hard-to-handle loads. You get fast, positive, 100 per cent clean-out every time. No special receiving equipment is needed . . . for either horizontal or vertical delivery.

Moreover, your shipments deliver worry-free in a Butler Pneumatic Trailer. The cylindrical shape saves weight, and it's the sturdiest and safest design yet developed for a pressure vessel. Careful automatic welding eliminates stress. Code and ICC safety factors are incorporated. And with no interior belts or liners to wear out, costly downtime is minimized.

Cement . . . gypsum . . . fertilizer . . . fly-ash . . . whatever you handle . . . it will pay you dividends to go bulk with Butler. We will be glad to advise you if your product can be readily delivered in a "P-D" trailer. And Butler also provides a full line of high-quality steel and aluminum transports for liquid hauling needs. Write direct to the Butler office nearest you for details.

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PUBLICITY SELLS AG-LIME

continued from page 110

JIMMY POTTS, right, receives the Texas Agricultural Limestone Association's first award for his lime demonstration plot. President Ned Sneed of Austin makes the presentation. Young Potts used lime on his garden to get an 11-percent increase in yields

Down in Harris County near Houston, a truck farmer put 1½ tons of lime per acre on his tomato land. Came harvest time, he started comparing the tomatoes. He had already observed that the plants on the limed soil came off earlier, and that the blossoms would stick better. At harvest, he was agreeably surprised to find heavier yields. But his customers gave him the pay-off. They bought the culls from his limed soil in preference to his No. 1 and No. 2 grade tomatoes from the unlimed. Mr. Thornton was quick to grab this information for the limestone industry publication, Limelights.

No association can make the most of its opportunities without its own house organ. Limelights does a good job for the limestone industry in Texas, Director Thornton believes. The 8½ x 11-in., 1-page letter-press sheet, goes to about 2,500 influential agricultural leaders in Texas once each month. The circulation list shows the names of county agents, soil conservation personnel, vocational agriculture teachers, agricultural stabilization conservation people and the farmers and business leaders on county agricultural committees.

Information consists of short paragraphs of convincing ideas about the value of limestone on the soil. These excerpts tell his story: "T. R. Crow of Henderson County made three times as much corn on the limed part of his field as on the unlimed part. Mr. Crow says the fertilizer worked better."

Another example: "Lloyd Smith of Brazos County says his cattle stay on that part of the pasture he limed last year. He is liming the remainder of his pasture so that he can get uniform grazing. Mr. Smith says his cattle are in the best condition they have ever been, though they are grazing only part of the pasture."

Director Thornton's pictures tell the same story. He uses a right and left. A typical cut line for his pictures: "Vetch needs lime—the entire field fertilized. Right has no lime. The left one has one ton of lime an acre. The background has two tons of lime an acre."

Readers have no difficulty seeing where the heavy production lies. And the pictures add convincing proof that if farmers will buy lime for their soil, the lime will more than pay for itself.

Another situation of which Mr. Thornton takes quick advantage is that farmers need not pay for the entire cost of liming their soils. ASC County offices pay a part of the cost of applying lime when the farmers comply with certain stipulations. There are 104 counties in Texas where farmers may receive such payments. Thornton visits many of these offices to learn what progress is made in the lime program. He also visits the State office at College Station to keep up with activities at the state level.

The Association seeks out ways to cooperate with others who are promoting activities that would help put more limestone on Texas soils. One of these is the soil fertility program now operating in 10 pilot counties in Texas and sponsored by the Extension Service of Texas A & M College. County agents in these counties are promoting an extensive program, putting more fertilizer in the soils.

"Limestone is basic to a sound soil fertility program," reminds Jack Barton, extension soil conservationist for Texas A & M. Mr. Thornton attends many of the meetings called by county agents to discuss fertilizer problems with the farmers.

Director Thornton travels a third of the time, about 20,000 miles a year, talking with farmers, visiting agricultural leaders and assisting spreaders. He was with three spreaders in a recent week.

"One of the spreaders had arranged for me to speak to five different vocational agriculture classes in high school, then he asked me to ac-

company him to visit the county agent, the soil conservation technicians and the ASC office," Mr. Thornton revealed.

"The second spreader wanted me to help arrange for a fair exhibit, provide certain materials and plan the background. The third spreader, however, didn't want any particular assistance at that time, so we shook hands and parted."

Executive Director Thornton is not certain which of the three media he uses is best. He uses radio, news articles and his own publication, Limelights, but believes that each has an effective place in the Association's publicity program.

But even with these helps, it's still a tough job convincing farmers they should use more lime. Lime doesn't make the spectacular change in crops like nitrogen. Sometimes it's a couple of years before the farmer can see any difference at all. Fortunately, spreaders do a lot of their own personal selling, and buy their supply of limestone direct from the crushers.

But the Association is slowly increasing the agricultural limestone business in Texas. About 12 to 15 percent of the total output of Texas crushers goes to farm lands. Only about 5 percent of the national output goes for this purpose.

First attempt at organization was a joint stock company with a rather loose structure that soon fell to pieces. Reorganized in 1954, the leaders decided upon a non-profit corporation with a Texas charter. Bassett Orr served as executive director of the Association until he resigned to accept a foreign assignment in Korea in early 1957. It was then that M. K. Thornton retired as extension soil chemist for Texas A & M College. He was chosen to fill the position because of his wide knowledge of Texas soils.

There are two types of membership in the Association: active and associate. Only the active members, the producers and the spreaders, have voting privileges—one vote per member. This applies even though some of the members have much larger operations than others. Spreaders, for example, range from one truck operators to the largest with 15 trucks.

The Association is governed by a board of seven directors, with much of the business authorization vested in the board. Members pay annual dues of $25 each, plus a small assessment for each ton of limestone sold. The executive director has no voting privileges but serves the board in an advisory capacity. END

LIMESTONE SPREADERS run trucks over farms, distributing lime for soil improvement. Spreaders are members of the Association and work closely with crushers

MANY limestone crushing plants are located along the Balcones Escarpment in Texas, and process a heavy tonnage of lime for use on farm lands

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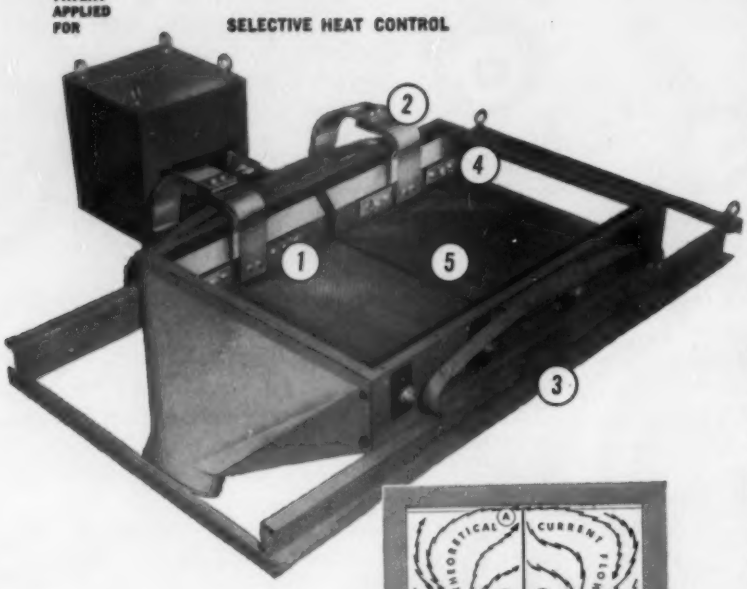

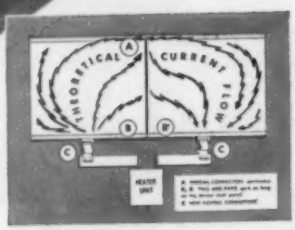

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What do you know about bin design?

by Tatsuo Tanaka*

THE FLOW OF GRANULAR MATERIALS out of bins without choking is of great importance to all rock products producers. Marked development has been made both in the basic fields of material handling, in feeders and in metering devices. The simplest method of material feeding is through a hopper. This has been widely used not only in small-scale laboratory experiments, but in large-scale industrial applications. Studies on the static properties of hoppers, especially those dealing with an inside static pressure, have been developed to some extent by several investigators. On the other hand, researches on dynamic properties of hoppers are scanty. Described here is one of them: the gravity flow of particles from hopper bottoms of bins.

From this study, we derived a general equation which represents the law governing gravitational flow rate of granular materials through hopper outlets. The equation was obtained by dimensional analysis and from empirical results in the lab.

Facts obtained in our study are correlated by a simple equation that makes it possible to determine the design and operation of hoppers. From the experimental results, these variables affect the rate of flow:

	Dimension
W: Rate of flow (g./sec.)	(M/T)

Please turn page

*Chemical Engineering Dept., Kanazawa University, Kanazawa, Japan

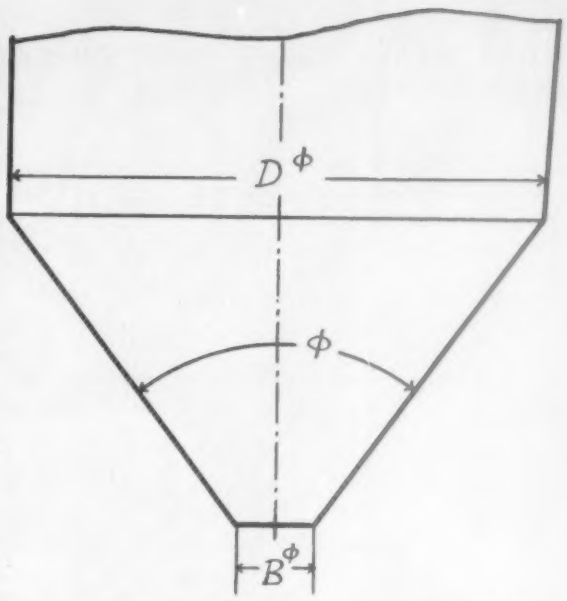

FIGURE 1—Round bin with conical hopper bottom was used in the laboratory experiments

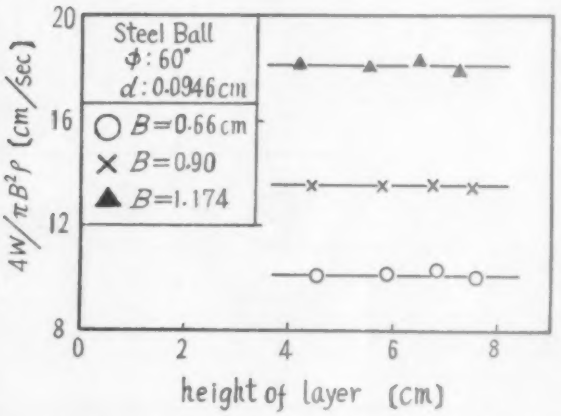

FIGURE 2—The rate of flow seems to be constant for any depth of material

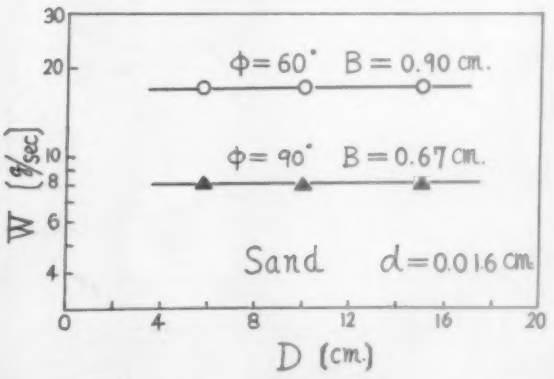

FIGURE 3—The rate of flow seems to be constant for each diameter of bin

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d: Particle size (cm.) ..... (L)
B: Outlet opening diam. (cm.) ..... (L)
μ: Coefficient of friction
ρ: Bulk density of particles (g./cm.^{3}) (M/L^3)
g: Gravity acceleration (cm./sec.^{2}) . (L/T^2)
tan ($\phi/2$): Angle of cone

Effects of some variables such as depth of material, diameter of bin, particle size, outlet opening, angle of cone, coefficient of friction and shape of outlet opening, upon the rate of flow of granular solids through hopper outlets are analyzed. These variables are correlated with one another with the aid of dimensional analysis, in Eq. (5). This equation can be used only when average size of particles is larger than 150 micron and angle of cone is smaller than 90 deg., as determined by our study.

Arching of materials takes place when the ratio of particle size to outlet opening exceeds .17 to .23. Therefore, a rectangular discharge opening should not be selected if arching of materials is to be completely avoided.

The schematic diagram of conical hoppers used in the experiments is shown in Fig. 1. These were made by combining each change of the diameter of outlet opening between 3.6 and 11.74 mm. with that of the whole angle of cone, 30, 60 and 90 deg. Granular materials used were sand, crushed glass, steel spheres and granular sugar. These were divided into groups whose average sizes were determined arithmetically from the standard sieve size opening, ranging from about 100 micron to 1 mm. The rate of flow was calculated by the time

Please turn to page 118

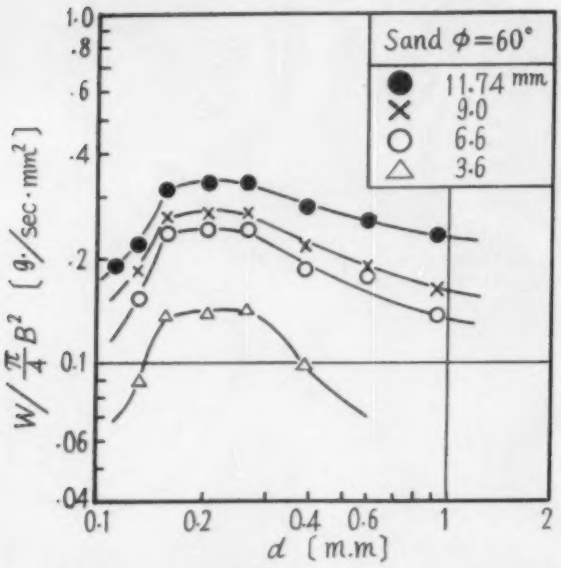
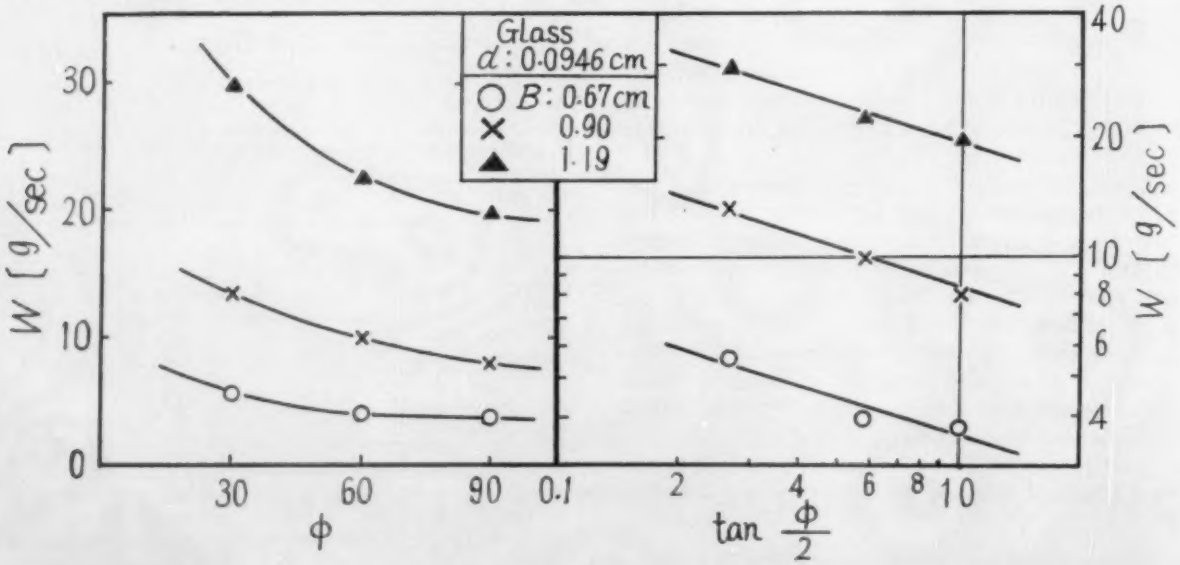
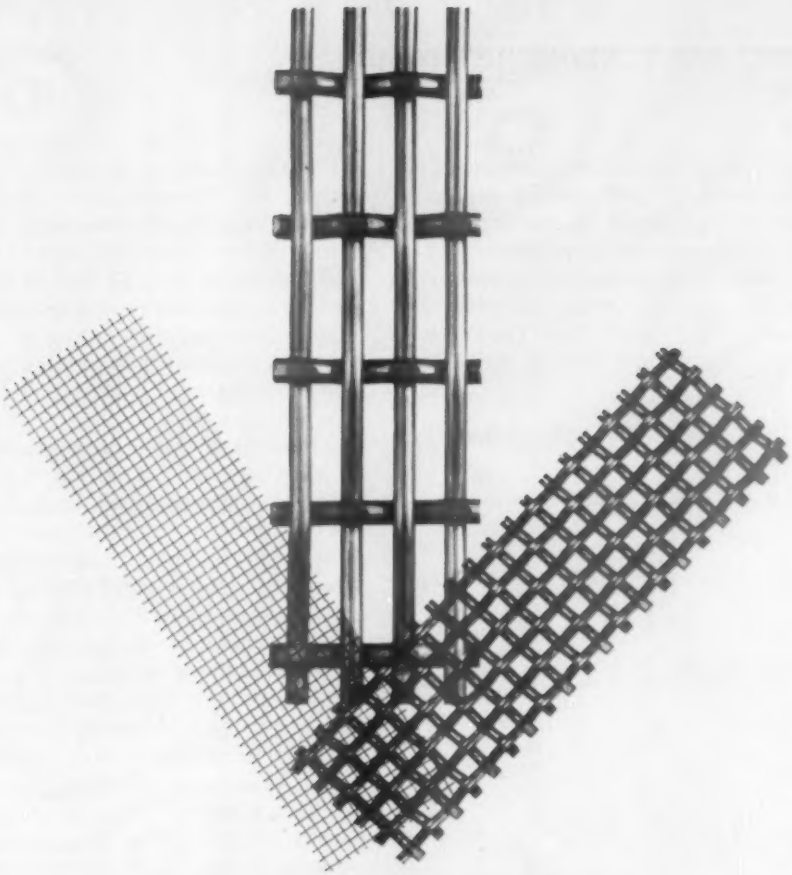


FIGURE 4—The flow rates of different particle sizes through hopper openings

FIGURE 5A (left)—The smaller the angle, the greater the rate of flow through the outlet. This information is plotted on a logarithmic scale in Fig. 5B (right)





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WHAT DO YOU KNOW ABOUT BIN DESIGN?

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measured by a stop watch until the whole mass of material had flowed out of the hopper.

It is well known that depth of material ordinarily does not affect rate of flow. Some people insist that this effect existed, especially when the coefficient of friction was very small and when the depth of material was sufficiently low. The present data summarized in Fig. 2 show that no such effect is recognized.

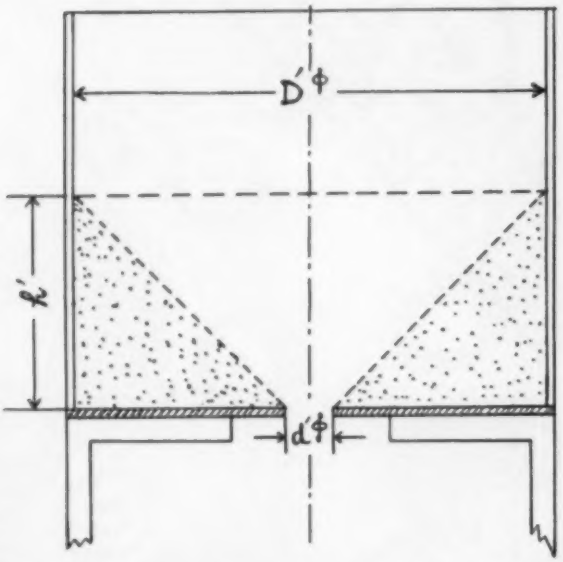
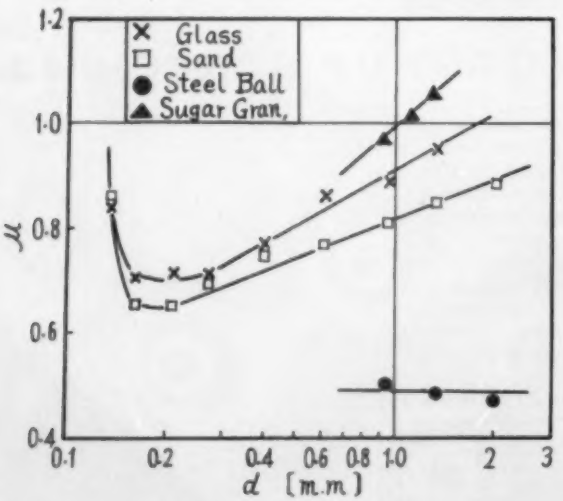


FIG. 6—The arrangement of lab apparatus for deriving the coefficient of friction of material flowing over itself

FIG. 7—Coefficient of friction in relation to particle size



Hoppers are often attached to bins or silos which are generally cylindrical, and the diameter of bin might possibly affect the mechanism of particle flow. Empirical results (Fig. 3) with three bin diameters, 5.7, 10 and 15 cm., showed that no effect existed upon the rate of flow itself. However, from the standpoint of the mechanism of arching this factor cannot be negligible, because arching action sometimes causes trouble in operation.

Particle size and outlet opening have an effect upon the rate of flow. Fig. 4 represents the logarithmic plots obtained from the flow rate of sand as the ordinate, and the particle size as the abscissa, for several outlet openings of hoppers with the constant cone angle. Initially, as the particle size becomes smaller, the flow rate increases. At the definite fineness of about 250 micron, the rate of flow remains constant until particle size becomes 150 micron. It then decreases with the decreasing size of particle. When the size becomes smaller yet, the particles stop flowing through the outlet, probably because of arching.

It is apparent that this phenomenon has a tendency to occur at a comparatively larger size of particle when a hopper having a small outlet opening is used.

At the other extreme, when the particle size is larger, the flow continues through some unstable state and choking takes place. This occurs when the ratio of the particle size to the outlet opening exceeds about .17 to .23. This value is an essential fact an engineer should bear in mind when designing a hopper for trouble-free operation.

Cone angle has an effect upon the rate of flow. For example, the flow rate of crushed glass plotted against the angle of cone in Fig. 5 shows that the smaller the angle, the greater the rate of flow. In case the outlet opening is larger, this effect is appreciable. But when the whole angle is larger than 90 deg., powdered material might not be able to flow out completely, and there would remain some fraction inside the hopper. This is not desirable. The value of valley angle, beyond which this phenomenon occurs, apparently decreases, provided that the angle of repose of the material is larger. Therefore the recommended whole angle of cone for design could be expressed as follows:

$$\phi < 180 \text{ deg.} - 2\theta \qquad (1)$$

where θ is the angle of repose.

The logarithmic plot of flow rate versus tan $(\phi/2)$ illustrates parallel straight lines as in

Fig. 5b, so that the following correlation exists:

$$W \propto \tan(\phi/2)^{-0.32} \quad (2)$$

This is available in the dimensional analysis discussed later.

The coefficient of friction influences the rate of flow and can be approximately evaluated. Fig. 6 illustrates the measuring tool with necessary sizes for calculation of the coefficient of friction. The particles flow down through the hole located in the center of the bottom plate of the glass cylinder whose side was properly graduated. After a completely stable state has been reached, the coefficient of friction (μ) can be computed according to the next equation.

$$\mu = \tan\theta = 2h'/(D'-d') \quad (3)$$

The results obtained for each kind of material are represented in Fig. 7. The locations of the curve of each material follow the order which agree with the order of shape factor reported by Heywood[1] as "circularity," that is, .6 for granular sugar, .65 for crushed glass, .75 for sand and 1 for steel spheres.

Furthermore, the values of μ are not constant over the wider ranges of particle size and generally increase with the increment of the latter. This tendency may be similar to the relation between the shape factor of particle and its size.[2] If we consider the interrelation of particle size, coefficient of friction, shape factor and porosity of packing, a brief method of the estimation of the particle shape might be derived.

Please turn page

FIG. 8—The cohesive forces of sand vary with particle sizes

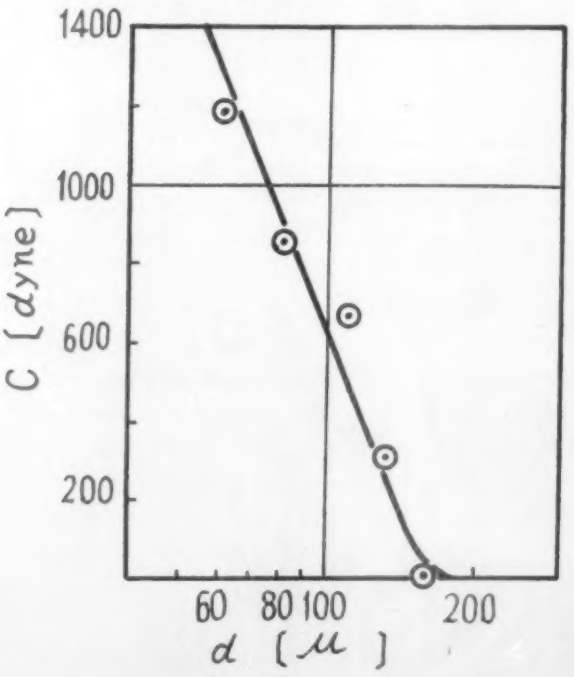
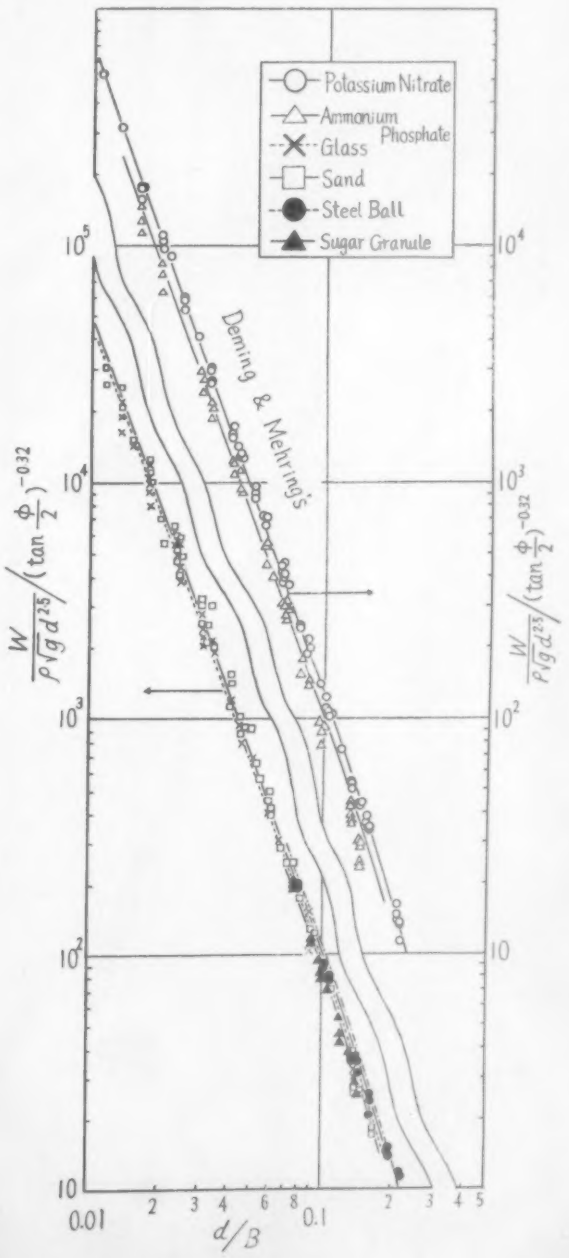


FIG. 9—The location of each straight line evidently depends on the coefficient of friction for each material



WHAT DO YOU KNOW ABOUT BIN DESIGN?

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It is remarkable to us that the value of μ represents the minimum value at d equals 150 micron and then suddenly begins to increase with the decreasing size of particle. This is essentially due not to the internal friction itself, but to the cohesive force which becomes appreciable when the size of particle exceeds the threshold value. The cohesive force is defined by Coulomb as follows:

$$F=\mu W+C \qquad (4)$$

where F is the frictional force, W is the vertical force due to the particle weight acting on the plane, and C is the cohesive force.

We obtained the values of C for sand by measuring the inclined angle of a plane which a mass of sand was made to slide down. These data were plotted against the corresponding particle diameters as in Fig. 8 which was a better proof of the validity of our ideas about the sudden increment of μ.

It is more convenient to divide the particles into two classes for consideration of coefficient of friction. In short, particles smaller than 150 micron have a greater specific surface and, consequently, an appreciable "surface effect." The average size should not be expressed as "average diameter," but in terms of the "measured" specific surface—that determined by means of permeability or gas adsorption methods. Particles within this range might be called "powder," and it is essential to distinguish this size range from materials larger than 150 micron which we deal with in this article.

From the dimensional analysis this correlation is obtained:

$$W/d^{2.5}\cdot\rho\cdot\sqrt{g}=f(d/B,\ \mu,\ \tan\phi/2)$$

To determine the exponent of each dimensionless

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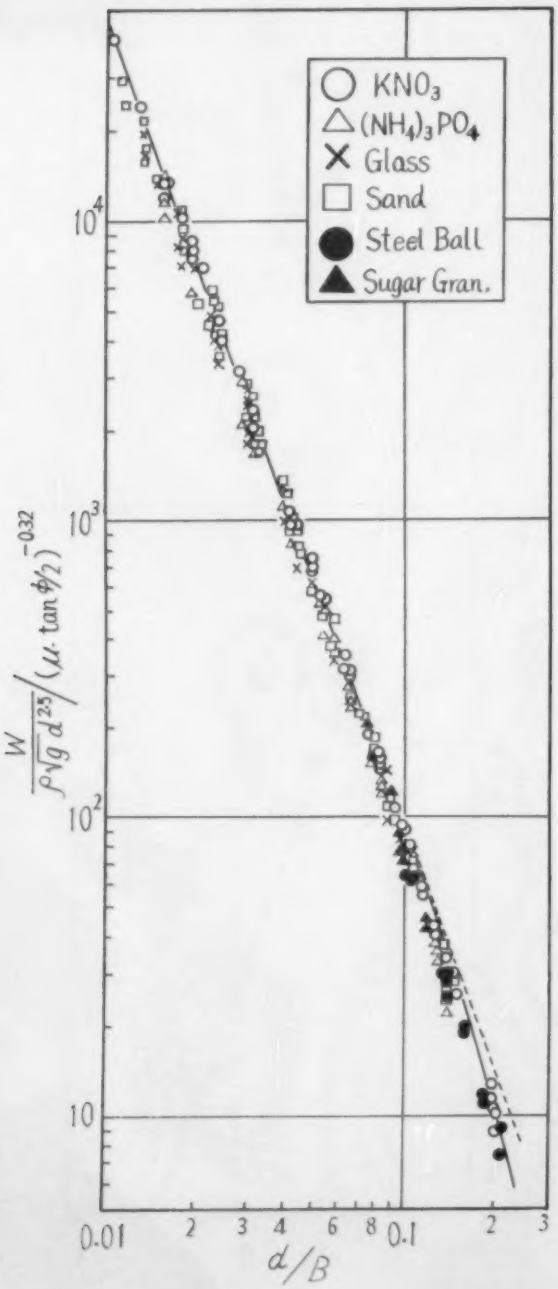
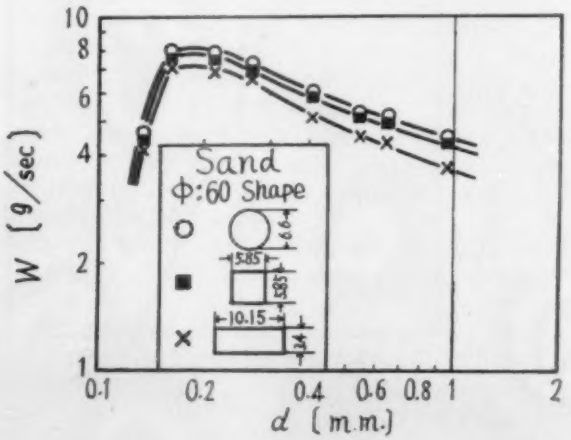


LEFT: Fig. 10—A summary of all data results in a satisfactory correlation for all materials

BELOW: Fig. 11—The rate of flow is influenced by the shape of the opening



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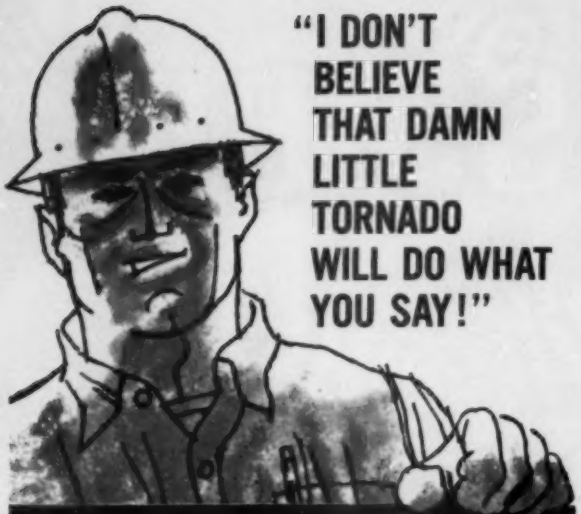

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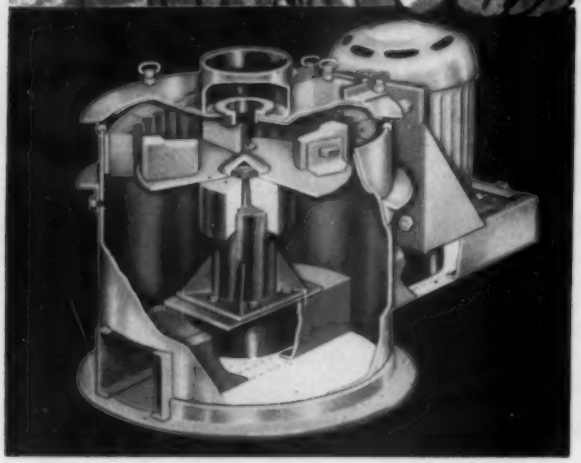

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CEMENT MILL BEARINGS

continued from page 108

(1) Oil within the bearing is continually filtered and freed of contaminants. The filter will remove all particles above 25-micron size and will absorb water that often collects as condensate from the atmosphere.

(2) Although very few mills require the cooler, its use assures the bearing of a continuous supply of cool lubricant. This is important if an unusual amount of heat is generated during grinding or if material introduced into the mill is unusually hot.

(3) The heater within the bearing reservoir will hold the oil to about 80 deg. F. At depressed temperatures, oil may cling to the internal buckets, so that less lubricant is delivered than the bearing needs.

(4) Power expenditure is small and more than compensated for by the lower horsepower loss in each bearing. The lower loss is due to heavier oil film and the minimizing of boundary lubrication at the relatively slow trunnion speeds.

(5) Since the system is running continuously, it is not necessary to insert elaborate interlocking and timing devices previously required to assure adequate lubrication before and during running periods, as well as after the mill has stopped.

(6) After the mill is stopped and it is contracting during the cooling-off period, the new system will keep the trunnions floated within the bearings to eliminate any distress that might result from sliding of two dry surfaces.

(7) Since the system is operated in conjunction with the internal bucket system, it can be stopped at any time for servicing without stopping the mill. If an internal, self-oiling system is not used, the interlock arrangement must be altered to stop the mill.

Please turn to page 124

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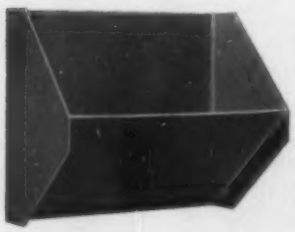

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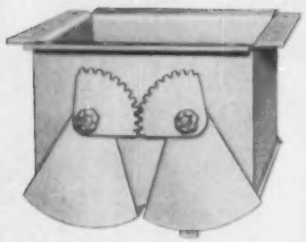

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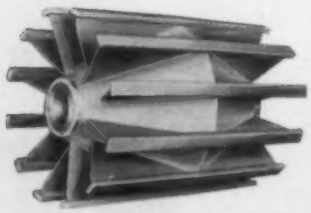

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CEMENT MILL BEARINGS

continued from page 122

(8) The system performs all the above functions without being constantly checked and with minimum connecting piping. Three pressure switches (S1, S2, and S3) indicate when the filter requires change, when the bearing reservoir oil level is critically low, and when the suction line or high pressure line is ruptured, cut or kinked.

The automatic lubricating system is Lubritrol, made by Allis-Chalmers Mfg. Co. Lubritrol systems can be added onto most existing mill bearings to provide mill protection with minimum maintenance and attention. **END**

WHAT ABOUT BIN DESIGN?

continued from page 120

group, the calcuiated values of $W/d^{2.5} \cdot \rho \cdot \sqrt{g}/(\tan \phi/2)^{-.32}$ were used from all experimental data as well as from the data on the two kinds of fertilizer published earlier by Deming and Mehring.[8] These were logarithmically plotted against the value of d/B which represents, as in Fig. 9, the straight lines of the same slope for each material.

The difference of the location of each straight line evidently depends upon the value of coefficient of friction of each material. The exponent of this factor can be readily obtained from the logarithmic plot of $W/d^{2.5} \cdot \sqrt{g} \cdot \rho/(\tan \phi/2)^{-.32}$ at constant value of d/B versus μ. It is found to be .32.

The final calculation of all data is summarized in Fig. 10 by the logarithmic plot $W/\sqrt{g} \cdot \rho \cdot d^{2.5}/(\mu \tan \phi/2)^{-.32}$ vs. (d/B), which is quite satisfactorily correlated for all materials. The empirical equation is expressed as follows:

for $d/B < .10$

$$W/d^{2.5} \cdot \rho \cdot \sqrt{g} = .18\ (\mu \tan \phi/2)^{-.32}\ (d/B)^{-2.70}$$

for $.1 < d/B < .2$ (5)

$$W/d^{2.5} \cdot \rho \cdot \sqrt{g} = .10\ (\mu \tan \phi/2)^{-.32}\ (d/B)^{-0.5}$$

These equations have the limits of $d > 150$ micron and $\phi < 90$ deg. for this application. Any units may be used for variables so long as they are consistent. For example, one can refer to CGS unit or ft.-lb. system without mixing in each dimensionless group.

There is one point left to consider: the effect of the shape of outlet opening upon the rate of flow. The measurements of flow rate of sand from hoppers having different shapes of outlet opening (circular, square and rectangular) with equal cross-sectional area are shown in Fig. 11. The rectangular section is unfavorable not only because the flow rate is smaller than the others, but because equivalent diameter expressed in Eq. (6)

$$B = 4 \times (\text{cross sectional area})/(\text{perimeter}) \quad (6)$$

Please turn to page 126

More efficient CRUSHING AT LOWEST COST for labor, power and upkeep with WILLIAMS REVERSIBLE IMPACTOR

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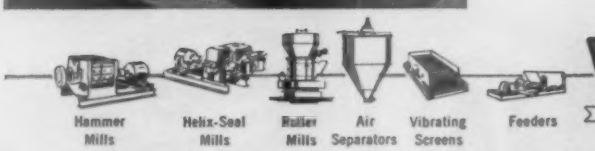

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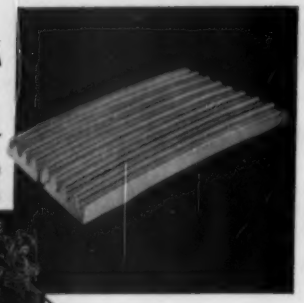

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WHAT ABOUT BIN DESIGN?

continued from page 124

is so restricted that the safe operating range will be much smaller than the other types.

References which we have used on this subject are: (1) Carman, Trans. Inst. Chem. Engr. (London), 15, 150 (1937); (2) Brown, Unit Operation, p. 22 (1950), J. Wiley; (3) Deming & Mehring, Ind. Eng. Chem., 21, 661 (1929). Acknowledgement is made to S. Kawai, who assisted with the experimental work and calculation. END

STATISTICS—BANE OR BOON?

continued from page 85

tistical data. This is important whether or not an expansion of Bureau activities is desired. Many Congressmen think that sand and gravel and stone exist everywhere—like water—and require little in the way of information or technology by comparison, anyway. Right now, the special minerals needed for our space program command most of the attention from Congress. This is glamorous stuff; sand and gravel isn't. Most Congressmen would much prefer to go home and tell their constituents they helped appropriate money for the space program than for nonmetallic minerals.

Unquestionably, the Bureau of Mines at present doesn't gather statistical data, or tackle research work and special projects on our industries on a scale commensurate with the complexity, magnitude and importance of the industry. If the Bureau is to improve and expand the technical and statistical information to our industries, there must be more interest and support than presently exists; otherwise the funds and effort will be channeled primarily into other minerals where the interest and support are strong.

Thus, it seems evident that when and if the rock products industries make it know that they want more and better statistics—and are willing to contribute, as individuals, in assembling them—the avenues in this direction will be opened. END

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Arnold Abbrot, with over 20 years' experience with the Kaiser Company, supervises the Kaiser Radum plant, one of the industry's most modern and efficient. Plant handles a feed of 1200-1300 TPH rock, gravel and sand.

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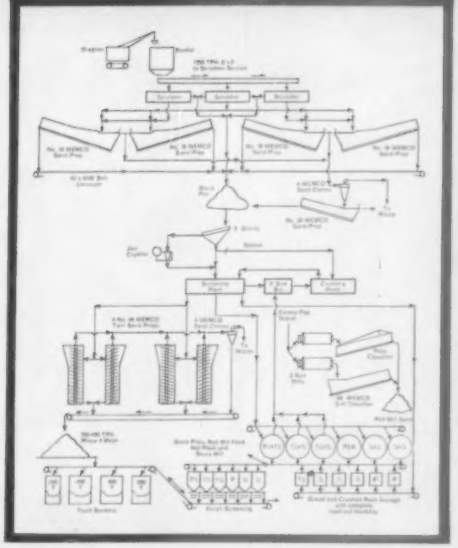

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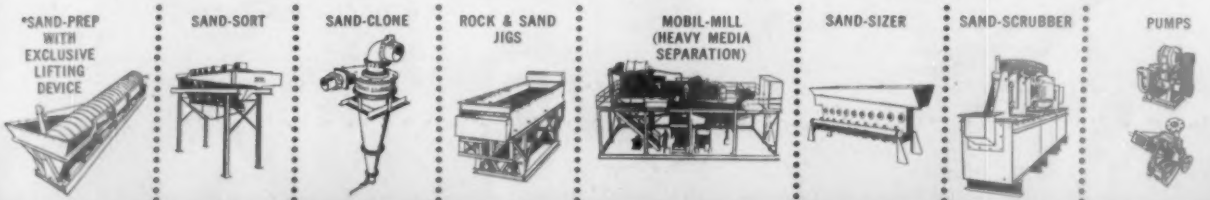

ROCKY'S NOTES

continued from page 22

Mg, and 1.5 mol percent of Si was replaced by Al. It was found that both systems consisted of C_3S, γ-C_2S and βC_2S. The graphs show that in the A series the γ-C_2S decreased rapidly while both βC_2S and C_3S were increasing. At about 50 percent C_3S, both the γ- and β-C_2S decreased in approximately the same ratio.

In the B series, the β-C_2S percentage remained approximately the same until the percentage of C_3S was about 50 percent, while the percentage of γ-C_2S decreased rapidly as in the A series. We might interpret this to mean that the substitution of small percentages of Mg and Al not only aided the formation of Ca_3S, but helped retain—in the process—the useful βCa_3S.

A paper by a cement company representative, Kikuji Goto, attempts to describe the behavior of particles of raw mixture in the burning process in making clinker. It is concluded that the burning process is influenced by the thickness of the reaction layer, which proceeds from the surface into the center of the particles. The first 5μ react quickly, forming a liquid phase; but thereafter, the reaction proceeds more slowly with almost the same velocity, which is influenced by the lime saturation ratio and the quantity of liquid phase.

The sum of the Al_2O_3 and Fe_2O_3 is closely related to the quantity of liquid phase, which is about 2.5 to 3.0 times the sum of Al_2O_3 + Fe_2O_3. The most liquid phase of the clinker is formed by the reaction layer of 1μ thickness, and the reaction then proceeds from solid phase to solid phase, with the liquid phase of nearly constant composition in between. The quantity of liquid phase between 1,400 and 1,500 C. differs only by about 1.5 percent.

The texture and products shown on the surface and on a cross-section of hydrated cement clinker paste were studied by two professors at Toyko Institute of Technology. Gypsum was purposely left out of the samples. These samples seemed to be mainly $Ca(OH)_2$, C_3SH_2 and C_3SH_4 crystals and its gel. It was noted that crystals exist in groups, but uniformly. Another study at Toyko Institute of Technology failed to prove the existence of $C_3A \cdot 3CS$ in hydrated portland cement.

Two cement company technologists studied calcium sulfoaluminate hydrate by use of a radio isotope (sulphur 35). Their conclusions are: (1) When fresh cement is mixed with water, a considerable amount of gypsum is combined as calcium sulfoaluminate in a few minutes; thereafter, the rate of its formation becomes very slow. (2) In slightly aerated cement, the combination occurs after about 3 min. at a highly accelerated rate.

Please turn to page 130

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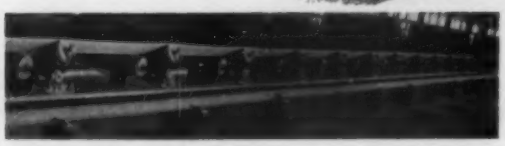

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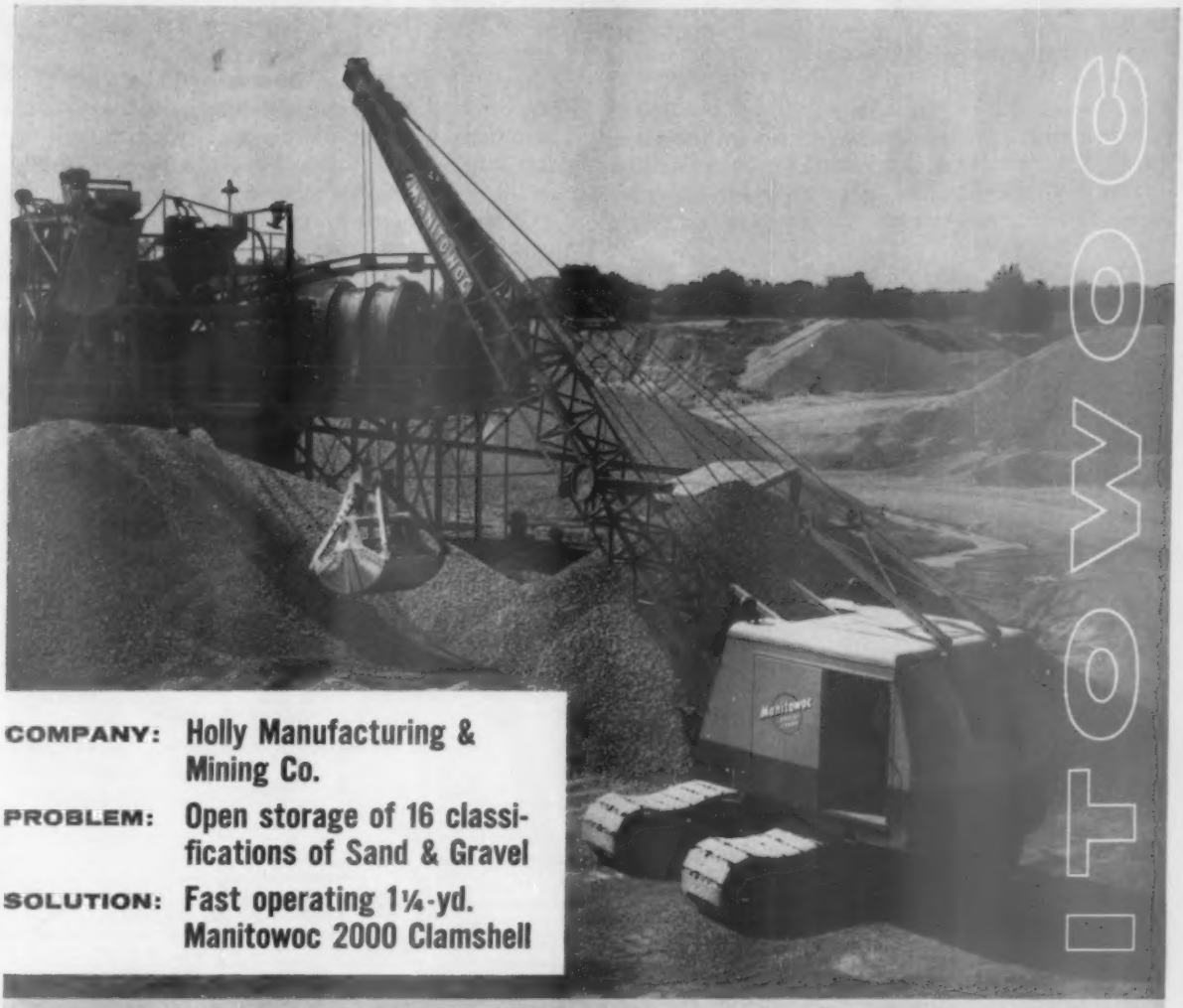

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ROCKY'S NOTES

continued from page 128

(3) When the cement is aerated at high humidity, calcium sulfoaluminate is also formed [at the same time]. That may explain a reason for irregularities in cement from the same source or, in other words, lack of uniformity which has received so much recent publicity.

The effects of calcium chloride on the rate of formation of calcium sulfoaluminate in the hydration of portland cement were investigated and led to the following conclusions (in part): Calcium sulfoaluminate formation in the hydration of normal portland cement occurs in two stages. In the initial short stage, the reaction occurred very rapidly: in about 5 min.—approximately 10 percent of the C_3S was combined—and then the reaction continued from 1 to 5 hr., with the amount of uncombined gypsum remaining almost constant within that time. In the later long stage of reaction, the formation of calcium sulfoaluminate became markedly active again after 5 hr. of hydration, and almost all the remaining gypsum was consumed in 24 hr. in the case of cement with ordinary content of gypsum (SO_3—1.5 percent).

In the case of cement with a higher content of gypsum (SO_3—4.58 percent), the reaction continued gradually, increasing in tempo for 28 days or more. It was found that 43 percent of the C_3A had combined with the gypsum in 28 days. By the addition of calcium chloride ($CaCl_2$ at 2 percent of the cement), the reaction forming calcium sulfoaluminate was remarkably accelerated in the initial stage of hydration. About 15 percent of C_3A in the cement was combined in 5 min., and all the gypsum was used up in 30 min., with cement of normal gypsum content.

In the case of cement with higher gypsum content, the reaction was accelerated in the initial stage; but in the later stage, the degree of reaction was lower than that of cement containing no $CaCl_2$. The investigation further observed that the reaction of calcium chloride, considered by Kalousek to form calcium-chloro-aluminate ($C_3A \cdot CaCl_2 \cdot 10\ H_2O$) seemed to become remarkably accelerated in the later stage of hydration, especially in the period where the total gypsum had been used up. The $CaCl_2$ was observed to combine with about 21 percent of CA_2 of the cement in 5 hr. and 42 percent in 28 days.

Thus, it would appear that the result of using gypsum in portland cement as a retarder is much more complicated than generally appreciated.

Since we have already used as much space as we are entitled to, we will have to continue this discussion in the following issue of ROCK PRODUCTS, for we have referred here to only about one-third of the papers presented.

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TRUCK TALK

by CHET CUNNINGHAM

NO LONGER IS IT A LUXURY to own special driver testing and training equipment. Now a portable testing kit called "Driverlab" is on the market for under $250. This compact lab covers these areas: Brake reaction time, visual acuity, field of vision, depth perception, color vision, night blindness and glare resistance.

There are four separate testing units. This means that four persons can be taking tests or training at once. Results of the tests are printed on a chart. The testor shows the driver his score in terms of driving situations.

In this way, each driver knows his weak points and his limitations. Then as he drives he compensates for these factors and learns to be a better driver.

Two aspects of trucking are vitally important to most drivers: starting and stopping. That's our cue to talk about stopping—and that means brakes. Here's a 9-point check list on brake inspection that comes to us from World Bestous.

1. Examine air, hydraulic and vacuum lines, wheel cylinders, fittings, couplings and brake chambers for leaks, crimps, or cracks. Replace damaged parts or tighten as necessary to eliminate leakage and restrictions. Poorly functioning air and hydraulic systems can substantially reduce lining life and brake efficiency.

2. Examine brake pedal linkage. Repair, replace or lubricate and adjust to get free movement and slack.

3. Check drums for out-of-round, bell shape, barrel shape, scoring, heat checking and cracks. Turn or replace as needed.

4. Compare old retracting springs with new springs to check tension loss. Use new, heavier springs when sintered metal blocks are installed.

5. Discard brake shoes that have broken welds, cracks, worn cam or anchor bearing surfaces, bent or warped tables and elongated rivet or bolt holes.

6. Check grease seals carefully. High-temperature grease and heat-resistant seals should be used on heavy-duty brakes, particularly if sintered metal linings are installed.

7. Check to be sure that heat-resistant bushings are used in anchors and cam shafts. This is essential if sintered metal blocks are installed.

8. Discard bolts that show signs of wear, distortion and heat damage.

9. Thoroughly clean all parts of the brake before relining. Be sure that all oil and grease is removed from the drums.

Have you considered liquid petroleum (LP) gas for your truck fleet? Whether you drive over the road, door to door or off the road, you should look into the possibilities of LP gas conversion.

A case history: A ready mix operator in Norfolk has converted its 200 gasoline truck mixer fleet to LP gas. They say they save $450 a year per truck. Remember, each of these trucks has two engines—one for motive power, and one 60-hp. engine to run the mixer.

Detailed cost records show these results: Fuel consumption remains the same. But fuel costs have dropped 40 percent. Oil consumption has dropped by 90 percent. Oil filters last 10 times as long. Spark plugs and points last 3 times longer. And engine life increases at least 20 to 30 percent.

Here's how the savings figures were tallied: Lube oil went from 60 to 6 gal. per yr., with oil good for more than 10,000 miles before change. That saved $41 per truck per year. Oil filter changes dropped from 15 to 2 per yr., a savings of $38 per yr. per truck. The two engines used 36 plugs per yr. before; now they use 12 plugs per year—a savings of $12.50 per truck per yr.

The big savings is fuel; they now save $360 per truck per yr. because of the less expensive LP gas fuel.

This isn't the end of savings. The maintenance crew for 200 trucks was cut by four men. This lopped $18,000 off payroll.

Added savings came on engine life extension, even on some trucks that were used for one or two years longer than normal. The conversions cost this company about $475 for each truck. Current savings amortizes this expense over the first year. Could an LP gas conversion offer savings to your truck fleet?

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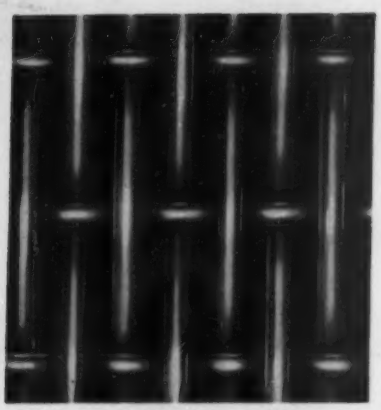

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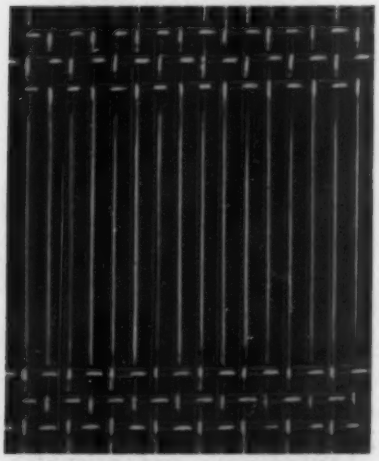

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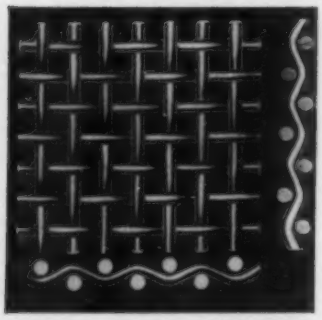
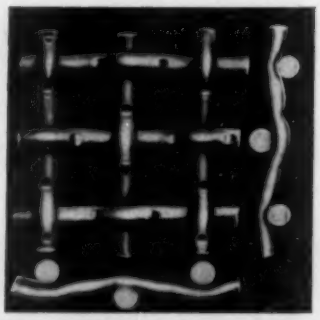
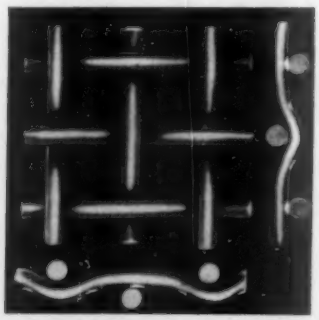


LONG LIFE — Even under severest operating conditions Double Crimp cloth is most effective. That's because it's built so all wires get equal wear.



VERY ACCURATE SIZING — Because each wire of Lock Mesh Cloth is constructed in a "locked-in" position, it's one of the best available for vibrators and trommels.



MINIMUM RESISTANCE TO MATERIAL FLOW — With all the crimping on the underside, CF&I Space Screens with Flat Weave set up minimum turbulance to materials going through.

CF&I SPACE SCREENS

THE COLORADO FUEL AND IRON CORPORATION

In the West: THE COLORADO FUEL AND IRON CORPORATION — Albuquerque • Amarillo • Billings • Boise • Butte • Denver El Paso • Farmington (N M.) • Ft Worth • Fresno • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City Phoenix • Portland • Pueblo • Sacramento • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita
In the East: WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Phila.
CF&I OFFICE IN CANADA: Montreal CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

CF&I STEEL

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READER-SERVICE CARD

RP-2-61

ROCK PRODUCTS
79 W. Monroe St.

FEBRUARY, 1961
Chicago 3, Illinois

Cannot be serviced after April 1, 1961 postmark.

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2. **New Machinery**
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There is a wealth of valuable information in the manufacturers' booklets offered in this issue. For your convenience, each advertisement, each new machinery and new literature item has been given a key number. Simply fill in the proper key number in the appropriate space on the card above and send it to us. We'll do the rest.

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NEW PATENTS

by OLIVER S. NORTH

RECENTLY ISSUED PATENTS ON NONMETALLIC MINERALS*

Magnesite

2,881,048—To substantially reduce or completely eliminate the silica content, crude **magnesite** is subjected to sudden contact with hot gas, causing explosive disintegration of the mineral and immediate entrainment of the silica particles in the effluent gas. (to E. Bieneck and E. Schroth; assigned to Didier-Werke A.G.)

Canadian 587,825—To produce a calcined refractory-grade **magnesite** from crude rock containing too much silica, the ore is ground, pulped at a pH of about 8.5, and subjected to froth flotation in the presence of a reagent consisting of cresylic acid and a high molecular weight aliphatic amine acetate to remove part of the silica and then put through secondary cells to float a low-silica magnesite product. (to A. J. Weinig; assigned to Basic, Incorporated.)

Mineral wool

2,888,060—Process and apparatus for forming **mineral wool** mats whereby the volume weight of the mat per unit length of the conveyor is maintained substantially constant. (to S. O. K. Kjell-Berger; assigned to Rockwool Aktiebolaget)

Trona

U.S. 2,919,909—Method for recovering mineral salts, especially **trona,** where the mineral occurs at considerable depth in relatively narrow seams overlying a main mineral bed. The lower bed is first partially removed by solution mining methods and the overlying seams are thereafter caved and dissolved selectively. (to K. C. Rule; assigned to Food Machinery & Chemical Corp.)

Gypsum

2,901,321—In a method for desulfurizing **gypsum** or **anhydrite,** the rock is ground and heated at 1000-2000 deg. F., and thereafter the temperature raised to 2100-2700 deg. F. The sulfur dioxide drawn off may be used to make sulfuric acid, while the high-purity calcium oxide residue is suitable for use in making pharmaceutical products. (to K. S. Horn)

Canadian 588,503—Device for turning over **gypsum** plasterboard between the presses and the drying kiln, so that a better finish can be obtained on the outer surfaces of the board. (to R. C. Blair and J. Marczewski; assigned to Western Gypsum Products Ltd.)

Kyanite

U. S. 2,921,859—Use of **kyanite** or **sillimanite** along with coarse and fine zircon in the manufacture of insulating refractories. (to Y. Godron; assigned to Soc. Anon. des Manufactures des Glaces et Produits Chimiques de Saint-Gobain)

U. S. 2,923,997—Design for and method of manufacturing improved saggers for use in the glazing of clay tile, utilizing a mixture of calcined alumina, raw 48-mesh **kyanite** and air-floated **ball clay.** (to R. W. Emmerling; assigned to United States Ceramic Tile Co.)

Asbestos

2,886,459—Use of 8 to 40 mesh **mica** and medium length **asbestos** fiber in a bituminous coating composition having the color and metallic appearance of copper. (to J. L. Lajoie; assigned to The Patent & Licensing Corporation.)

2,886,484—Improved method of making a dry process normal cured sheet consisting of **asbestos** fiber and **portland cement.** (to C. V. French and E. R. Ihne; assigned to Johns-Manville Corp.)

2,888,357—Use of **asbestos** fiber and exfoliated **vermiculite** in a thermal insulating bituminous composition. (to C. U. Pittman and J. C. Christensen; assigned to Koppers Co.)

2,889,242—Method of manufacturing wallboard comprising a fiber, e.g., **asbestos,** and a cellulosic substance, such as saw dust, wood chips, corn stalks, reeds, etc. (to C. F. Teichmann; assigned to Texaco Development Corp.)

Mica and talc

2,892,592—A railroad tie pad comprises rubber, ground oystershell, and petroleum asphalt, and a dusting of ground **talc** or **mica** to make the pad nonadhesive and nonbleeding. (to J. H. Greene and R. R. Thurston. Assigned to Texaco, Inc.)

2,894,928—A simulated snow composition for application from an aerosol bomb comprises a liquid propellant, a synthetic resin, and a ground inert mineral filler, such as **mica** or **talc** and preferably a micaceous talc, which facilitates spraying of the composition. (to J. T. Hohnstine, J. A. Versocki and F. L. Steckhahn. Assigned to American Home Products Corp.)

Gilsonite

Canadian 590,496—Use of **gilsonite** in the production of electrical insulating compounds having low dielectric constants. Buna S or other rubber is the vulcanizable constituent. (to T. K. Cox; assigned to Western Electric Co., Inc.)

Stone, dimension

2,882,888—Machine for breaking stratified rough **dimension stone** of irregular sizes and shapes to form relatively long, narrow pieces having a small cross sectional area. (to W. J. Saloga)

END

*Copies of United States patents are available at a cost of 25 cents each (photostat copies of foreign patents at 30 cents per page) from The Commissioner of Patents, Washington 25, D.C. For convenience, coupons, each good for one copy of any patent, may be purchased from that official at the rate of $5.00 per 20-coupon pad or $25.00 per 100-coupon pad.

In Cement and Aggregates the Word for Air Separation is "Sturtevant"

in cement . . .

Sturtevant Air Separators make possible highly efficient closed-circuit systems. Large circulating loads increase output, eliminate overgrinding. Ball and lining life lengthens, power costs are lowered. Top quality cement results from precise control of finenesses. Standard 16 ft. Sturtevants deliver raw fines up to 70 tph, finished fines up to 260 bph.

in aggregates . . .

Sturtevant Air Separators classify sand without water, clean sand by de-dusting it. Pre-classification by air can also increase screening production by removing screen-blinding fines. In blending operations, Sturtevants select desired fines from grinder throughput. This graded product is then used to overcome fineness modulus deficiencies.

Send for Air Separator Bulletin No. 087.

STURTEVANT
MILL COMPANY
102 Clayton St., Boston, Mass.
Crushers • Grinders • Micron-Grinders • Separators
Blenders • Granulators • Conveyors • Elevators
Enter 1080 on Reader Card

NEW LITERATURE

FOR FREE INFORMATION on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue

Wire rope design

MACWHYTE WIRE ROPE CO. has made available a new bulletin which catalogs and describes the company's new wire rope design. The design consists of 7 rope strands helically laid around a core. It is a 7-strand wire rope plus an independent wire rope core. This is claimed to embody the flexibility of 8-strand rope, the fatigue-resistance of 6 x 37 rope, and the ruggedness of 6 x 19 rope.

Enter 500 on Reader Card

Vibrating screen with screen heater

THE DEISTER CONCENTRATOR CO., INC. is offering a bulletin that describes the company's vibrating screen with a screen heater. This screen offers differential motion which keeps meshes clear of intermediate size wedging particles, and a heater which keeps the screen wires warm and dry for uninterrupted production. Included in the catalog are the screen's features, description and types and sizes.

Enter 501 on Reader Card

Dry material feeder

VIBRA SCREW FEEDERS, INC. has issued a pamphlet entitled, "Tested Performance of Vibra Screw Feeders on Various Materials." Listed alphabetically are materials that have been tested and their results.

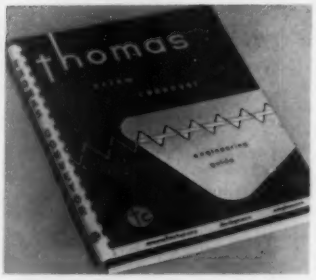
Enter 502 on Reader Card

Automatic sampling bulletin

DENVER EQUIPMENT CO. has published a 32-page bulletin entitled "The Economics of Automatic Sampling," by Paul E. Cook. This paper was presented at the Third Stevens Symposium on statistical methods in the chemical industry, which was sponsored by the American Society for Quality Control and Stevens Institute of Technology. Included in the bulletin are illustrations and diagrams.

Enter 503 on Reader Card

Screw conveyor engineering guide



THOMAS CONVEYOR CO. has released a 150-page screw conveyor engineering guide for qualified personnel who use or specify screw conveyor equipment. The guide contains several pages showing typical installations of screw conveyors. Three sections include charts and artwork with discussions on engineering, components and layouts. The final portion of the guide shows additional products which the company manufactures, a part number index and a general index.

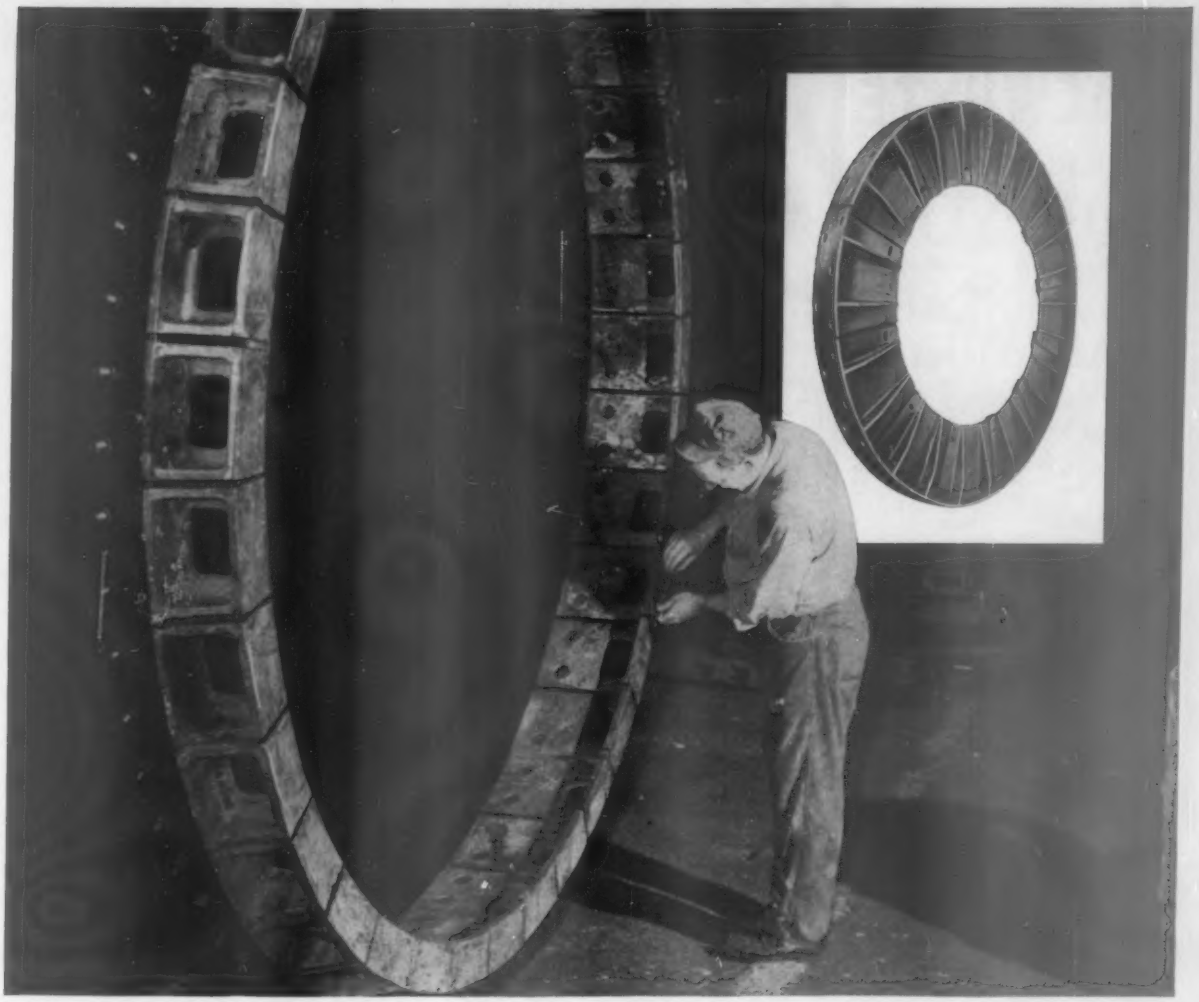
Enter 504 on Reader Card

Car handling systems

MCNALLY PITTSBURG MFG. CORP. has issued a bulletin on car handling systems. Included in the illustrated brochure are sections on automatic handling of cars, car hauls on two level, parallel tracks, car retarders, motorized car retarders and loading.

Enter 505 on Reader Card

(Continued on page 140)



IN CEMENT, LIME, AND DOLOMITE PLANTS...

B&W Nose and Tail-Ring Castings Demonstrate Longer Continuous Service

Longer brick life and longer continuous service are being attained by 275 kilns in 54 plants using B&W Nose and Tail-Ring Castings. In many cases, the life of these castings has exceeded 9 years.

Light and strong B&W Alloy Castings have improved kiln performance in most installations. Made of heat-resisting Grade HH alloy, nose ring castings eliminate belling out of the kiln shell, assuring longer brick life and longer continuous operation of the kiln. By protecting the end of the kiln shell from direct flame, the nose ring castings prevent "feathering-down" of the shell because of oxidation. Their design eliminates cracking and warping, experienced with large size castings.

Small size and light weight make B&W Castings easy and inexpensive to install. The protecting flange on the nose ring castings permits the use of low-alloy steel bolts for fastening.

Spare part inventory may be kept low because the same nose ring castings may be used on kilns varying up to 4 feet in diameter, depending upon size. Write for Bulletin S-17. The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

S-467

B&W

THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

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THE RIGHT
MACWHYTE
WIRE ROPE & SLING
FOR YOU

IS AS NEAR
AS YOUR

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MACWHYTE DISTRIBUTOR

ASK ABOUT MACWHYTE'S
NEW 7-FLEX® WIRE ROPE

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343
WIRE ROPE MANUFACTURING SPECIALISTS SINCE 1906

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FOR DEPENDABILITY
PLUS ECONOMY
REPLACE WITH
INDIAN BRAND

Get the most out of your present equipment. When you need replacements, remember we started in 1913 to build our reputation in the Manganese Steel field for dependability plus economy.

Insist on
INDIAN BRAND
MANGANESE STEEL

Shovel Dippers • Dipper Teeth
Shovel Treads
Crusher Jaw Plates
Mantles • Concaves
Bowl Liners • Roll Shells
Pulverizer Hammers
Grate Bars • Breaker Plates
Ball Mill Liners • Screen Plates
Misc. Manganese Steel Castings

THE FROG, SWITCH AND
MANUFACTURING COMPANY
Carlisle, Pennsylvania • Established 1881

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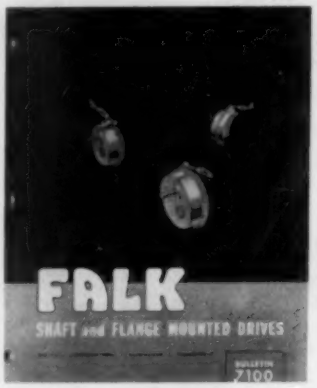
NEW LITERATURE

(Continued from page 138)



Shaft & flange mounted drives

THE FALK CORP. has issued a 36-page bulletin that presents shaft mounted drives and a new series of flange mounted drives covering a torque range up to 44,000 lb.-in. Design and construction advantages are included as well as selection and dimensional data, engineering drawings, accessories and typical application photos. Also explained and illustrated are the company's motor mounts for use with shaft mounted and flange mounted drives, and these compact, steel weldments are pre-drilled to accommodate rerated foot-mounted motors (½ to 30 hp.)

Enter 506 on Reader Card

Vibrating screens

HUTCHISON MFG. CO. has released a pamphlet covering the company's vibrating screens for general industry. Diagrams and illustrations are combined with descriptions and specifications concerning the screens. Using these custom-built units, the correct size vibratory unit is furnished, designed to meet exact plant and process requirements. There is engineered application of the feed and discharge system. The correct combination of relatively low amplitude and high frequency is also offered.

Enter 507 on Reader Card

Kiln metering & control

BAILEY METER CO. has released an 8-page illustrated brochure describing metering and control instruments for rotary kilns and associated equipment. The new brochure discusses the advantages of the "total job" approach for instrumentation in which kiln, cooler, mills and feeders are considered as one closely interrelated system. Illustrations of applications and components are included along with descriptions and diagrams of modern kilns, mills and coolers. Also included are record charts which compare percent oxygen and percent combustibles for various types of kiln operation. Both guided and unguided operation are shown.

Enter 508 on Reader Card

Nine-speed transmission

CLARK EQUIPMENT CO., Transmission Div., is offering a 4-page bulletin describing the company's 515-lb. aluminum 9-speed transmission. Photographs show the entire unit in its aluminum casing and the selector lever and range control button in the driver's cab. A chart illustrates the positioning of the gear shift lever. A cutaway drawing shows arrangement of gears and shafts within the casing, and there is a graph plotting engine rpm. against vehicle mph. through the 9 forward gear ratios. Longitudinal and transverse sections are drawn to scale, with dimensions stated. Specifications are also detailed.

Enter 509 on Reader Card

Crusher catalog

PENNSYLVANIA CRUSHER DIV., Bath Iron Works Corp., has issued an illustrated catalog that lists and briefly describes each type of crusher in the company's line. In some of the classifications, the crusher is discussed in a general way. Other bulletins are available from the company if more specific information is desired on certain model crushers.

Enter 510 on Reader Card

Electrostatic precipitators

BUELL ENG. CO., INC. has made available copies of a recent talk on electrostatic precipitators, by Lester L. Nagel, chief electrical engineer of the company. The paper discusses what the plant engineer should know about the requirements of an electrostatic precipitator for industrial applications.

Enter 511 on Reader Card

Force control system

GILMORE INDUSTRIES, INC. has released a technical reprint, showing schematics, details and applications on its six channel hydraulic force control system. Used for static and dynamic loading test stands, the system is designed for up to 100,000 lb. force capacity per cylinder and includes a load cell in series in each cylinder to provide the force feedback component to the console.

Enter 512 on Reader Card

(Continued on page 143)

ONLY DRACCO CAN OFFER

sonic cleaning

(patented)

the most modern and efficient method for removing dust from cloth-bag dust collectors

Dracco dust collectors now utilize one of industry's most exciting new techniques — *sonics* — to realize greatly improved filter bag cleaning action. This development is so significant that you should not specify or buy another dust control unit until you get the full story on sonic cleaning.

Sonic cleaning — patented and available exclusively from Dracco — provides three operating advantages: *lower back pressure* through effective dust removal; *longer bag life* since bags are not flexed, creased or shaken; *lower maintenance* through elimination of moving parts within the collector.

Cleaning by low-frequency sound waves has been conclusively proved in full-scale field operations on both Glass-Bag Filters and on conventional baghouses using cotton and synthetic bags.

Sonic cleaning is recommended for cement mill applications (kilns, grinding, classifying, materials handling), electric and open hearth steel furnaces, metallurgical furnaces, rock dryers, calciners, fusing furnaces, chemical processes and related applications. You can use it wherever mechanical shaking is undesirable or unsuitable and eliminate the shakers.

You can get further information on Dracco sonic cleaning and expert consultation on your dust control requirements from: Dracco Division of Fuller Co., Harvard Avenue & East 116th Street, Cleveland 5, Ohio.

Proved in service — Dracco Glass-Bag Filter equipped with sonic generators cleans cement kiln gases. Sound waves dislodge collected dust without wear or fracture of cloth.

DRACCO *airstream* conveyors
dust control equipment

FULLER COMPANY GENERAL

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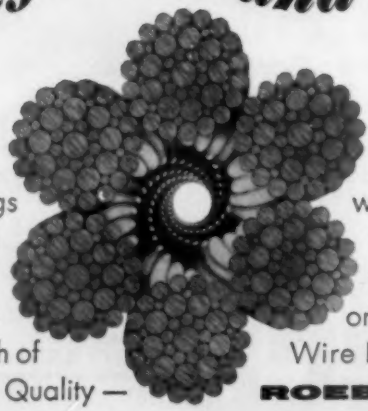
We put a lot of work into it
You get a lot of work out of it

quality inside and outside



Take a good look at the pictures. They show you where your savings really start—with the inner and outer uniformity of wires and strands. Unseen, but of utmost importance is the *extra* high strength of Roebling Royal Blue Wire Rope. Quality—inside and outside—is the extra working factor that pays off on the job for *you*. Find out more from your wire rope distributor, or write for free booklet to Roebling's Wire Rope Division, Trenton 2, N. J.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corp.

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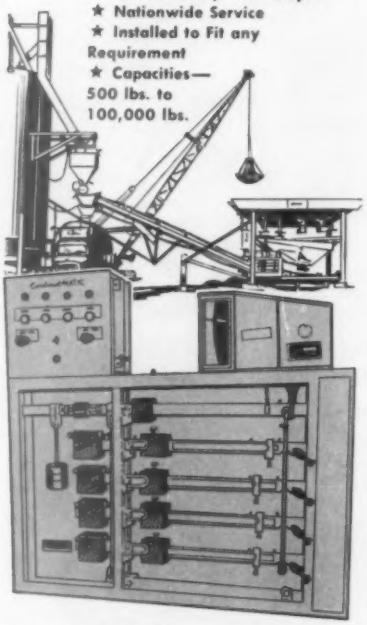
for all
CONCRETE
CONSTRUCTION
it's

Cardinal

all-steel
SUSPENSION
HOPPER
SCALES

★ Custom Built to Your Specifications
★ Most Delivery in 10 Days
★ Nationwide Service
★ Installed to Fit any Requirement
★ Capacities— 500 lbs. to 100,000 lbs.



"ALL-STEEL"
Construction—BUILT TO LAST A LIFETIME!

★ High tensile steel strength and design simplicity give lower installation costs plus lower maintenance.
★ Both Beam or Dial type available with manual, semi-automatic or fully automatic operation.
★ Scales adaptable for any hopper can be installed to suit any requirement.

WRITE FOR INFORMATION AND PRICES TO

Cardinal
SCALE MFG. CO.
Dept. 102
P.O. Box 151
Webb City, Mo.
also Sacramento, California

Enter 1085 on Reader Card

NEW LITERATURE

(Continued from page 140)

Inclined vibrating screens

LECCO MACHINERY & ENG. CO., Subsidiary of Fairmont Machinery Co., has released a catalog on the company's inclined vibrating screens. Included in the illustrated catalog are such sections as: frame design and construction, maintenance and conveying and screening action. Charts are given for open area required to pass a given size and tonnage, and recommended square openings to replace round perforations and produce the same size of material. Dimensions are included for the single, double and triple model screens.

Enter 513 on Reader Card

Safety training course

NATIONAL SAFETY COUNCIL has developed a safety training course for industrial foremen. The course consists of a series of six text booklets entitled "Men and Motives in Safety Supervision," and a manual for discussion-group leaders. Each text booklet is for a one-hour training session. The leader's manual tells how to set up meetings and apply the material to individual plant situations. The course offers instruction on ways a foreman can better understand his men and work with them toward safer, more efficient work practices.

Enter 514 on Reader Card

Induction motors

THE LINCOLN ELECTRIC CO. has released a bulletin that describes design features, performance characteristics, and size range of the company's redesigned line of squirrel cage induction motors. Designed to increase motor life under severe operating conditions, multiguard stator encapsulation and open protected construction is said to make the motor impervious to water, acid, abrasion, and both mechanical and electrical abuse.

Enter 515 on Reader Card

Measurement and control

NUCLEAR-CHICAGO CORP. has made available a bulletin on process instrumentation. The bulletin deals with measurement and control of percent moisture in solids, liquids, slurries and bulk density of solids, liquids and slurries. Included in the bulletin are diagrams and illustrations of bulk density, liquid density, bulk moisture and fluid moisture gauges.

Enter 516 on Reader Card

END

Thousands Save on Truck and Tractor Maintenance with Almasol Gear Lubricants

The same ALMASOL Wear-Arresting Agent which originally helped solve problems of high surface temperatures, extreme pressures, and acid corrosion on supersonic jets and space-conquering rockets is now providing *new dimensions of protection* for heavy equipment.

Transmissions and differentials on trucks, tractors and other heavy duty work equipment are critical areas. Here loads are heaviest . . . heat at maximum . . . failures costly . . . downtime lengthy.

Mass-produced automotive gear oil cannot handle the extreme conditions of pay-loaded equipment.

ALMASOL 607-608 Gear Lubricants are advanced products which have demonstrated time after time their ability to reduce frictional heat from 50° to 80° F. in heavy "work horse" fleets. The Almasol supplemental lubrication creates a friction inhibiting surface on gears and bearings, and protects against acid pitting.

ALMASOL provides a margin of protection far beyond the realm of ordinary gear oil. The Almasol film "takes over" when overheating or overloading creates conditions which would cause oil alone to fail.

FREE LITERATURE

We would welcome the opportunity to send you informative brochures discussing how LE's exclusive patented ALMASOL Gear Lubricants can increase your operating efficiency and save you money on maintenance costs — just as it has for thousands of other heavy equipment owners.

WRITE, WIRE OR PHONE DEPT RP-1

LE
LUBRICATION ENGINEERS INC.
Fort Worth 11, Texas
Custom Built Lubricants for Heavy Equipment

NAME_____
FIRM_____
ADDRESS_____
CITY_____

Enter 1084 on Reader Card

NEW MACHINERY

FOR FREE INFORMATION on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue

Ninety-five-ton truck

One of the largest haulage units ever offered to the rock products industry is a mammoth 95-ton capacity tractor-trailer combination. Its 700-hp. V-12 diesel engine is possibly the most powerful engine ever developed for this service. High tensile steel is used in the rugged body and frame to eliminate a great deal of dead weight.

Tires and transmission are in proportion to the capacity of the unit. The eight 21:00 x 35 tubeless 36-ply nylon cord tires are probably the largest ever mounted on demountable rims. They are dual-mounted to support the rear of both the tractor and the trailer. Front tires are 18:00 x 33 tubeless nylons.

A 19-in. single stage converter is mounted on the engine and delivers power to a 4-speed power shift transmission equipped with an oil brake. The traction wheels take their power from a triple-reduction, planetary-drive axle designed especially for this service.

Weight of the engine is 5,700 lb. to give a ratio of 8.1 lb. per hp. Empty weight of the whole rig is 120,000 lb. (KW-Dart Truck Co., Kansas City, Missouri)

Enter 100 on Reader Card

Bag packer with electronic accuracy

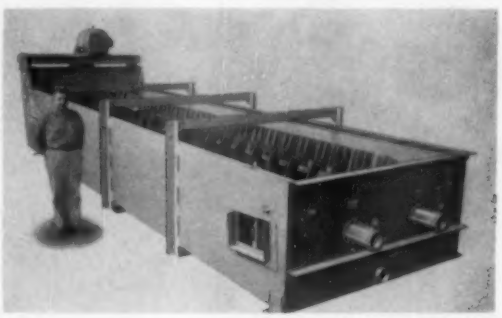
The new DX packer provides exceptional ease and accuracy for packing fine-powdered or granular materials in valve-type bags, open bags or drums. It offers repeatable accuracy with as little as ¼ oz. actuation of an electronic sensing device.

The compact unitized design is adaptable to multiple installations under the control of a single operator. Hoppers and feed system can be quickly and easily changed without tools in a matter of minutes. An over or under-weight indicator allows the operator to check or trim the weight without changing the scale setting.

Optional equipment makes the new packer exceedingly versatile. This equipment includes automatic starting, special settlers, interchangeable delivery screws and attachments for various bags and drums. A special packer is available for packaging products that are usually sold by volume rather than weight. (H. L. Stoker Co., P. O. Box 112, Claremont 63, Calif.)

Enter 101 on Reader Card

Paddle washer



Water-soluble clays now can be removed from crushed stone or sand and gravel with a newly developed paddle washer. This unit was designed for heavier service than the maker's coarse material washer. Yet, it is not intended for the extremely heavy chore of breaking down or removing plastic clays, soft stone or cemented aggregates.

The "Sol-Clay" washer has tubular steel shafts to which are welded steel spuds. Ni-Hard alloy iron paddles are bolted to the spuds to make an assembly about 36 in. diam. The tub is about 25 ft. long to provide ample scrubbing space to handle between 100 and 125 tph. of minus 2½-in. aggregates. (The Eagle Iron Works, 137 Holcomb Ave., Des Moines, Iowa)

Enter 102 on Reader Card

Please turn to page 146

UNIVERSAL IMPACT MASTER'S EXTRA PRODUCTION CAPACITY KEEPS TWO SECONDARY CRUSHERS WORKING HARD

Why Extra Production Capacity? Because Universal Impact Master's *straight-line flow* eliminates bottle necks, rebounding and congestion.

Rock, falling into the breaking chamber is shattered by the hammers and hurled forward through the upper screen grate. Oversize, falling into the second rotor hammers, is reduced to size and discharged. The rock always moves in a straight-line flow because the hammers turn in the same direction. All finished material is immediately removed from the breaking chamber.

Less power is required to get this high production. You get more tons per hour at a lower cost. And the highly cubicle finished product meets today's rigid specs. Gradation is controlled by simple adjustments.

Enjoy the *extra* dollar and cents benefits of Impact Master's Straight-line Flow. Just contact your Universal distributor for complete information.

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION

617 C Avenue N.W., Cedar Rapids, Iowa

A subsidiary of Pettibone-Mulliken Corporation, 4700 W. Division St., Chicago 51, Illinois

Sixty-ton truck

Two new end-dump trucks are LeTourneau-Westinghouse's offering for 1961. These models round out the Haulpak line of trucks by adding a 42-ton and a 60-ton unit at the high-capacity end of the group.

The LW60 is one of the world's largest end-dump trucks. Weighing only 33 tons empty, it is capable of hauling nearly twice its own weight in payload. This is achieved with the extensive use of high-strength steels and heavy-duty earth-mover-type components in its construction. Power is provided by a 550-hp. V-12 turbocharged diesel engine working through an autotmatic transmission to give a top speed of better than 46 mph.

The slightly smaller LW42 is powered with a 430-hp. turbocharged diesel and automatic transmission. Top speed of this rig is about 48 mph. In common with all other models in the line, this truck has no conventional axles and suspension springs. Instead, the wheels are mounted on four huge hydraulic shock absorbers.

There are no tie rods or exposed steering linkage in any of the units. The entire steering system is enclosed above or within the frame of the truck. At the same time, power steering and power brakes make each truck easy to handle and highly maneuverable. (LeTourneau-Westinghouse Co., 2301 N.E. Adams St., Peoria, Ill.)

Enter 103 on Reader Card

Cone crusher repair material

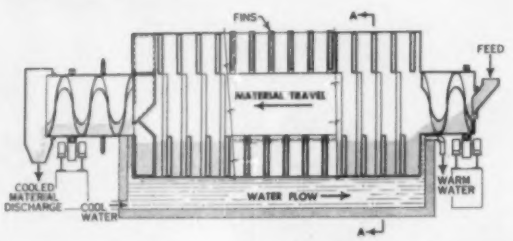
Nordbak is a newly developed backing material designed to support mantles and bowl liners in cone crushers. In contrast to conventional hot metals, the new backing compound can be mixed and poured at room temperature. It is about one-fourth the weight of zinc.

The new compound is simply and easily prepared. A container of a yellow liquid is mixed with a container of blue liquid and stirred to a uniform green color. The mixture must be poured immediately into the crusher cavity. There it will penetrate voids as narrow as ⅛ in. and set within 4 hr.

Field tests have shown that Nordbak has exceptional resilience and does not shrink away from metal on hardening. Thus, it gives full support to crusher parts from the very beginning. The material may be stored before mixing but must be used promptly after mixing. Batches larger than 22 lb. cannot be mixed at one time, and it cannot be successfully applied where the crusher feed material is hotter than about 175 deg. (Nordberg Mfg. Co., Milwaukee 1, Wis.)

Enter 104 on Reader Card

New cooler for hot fines



Hot, fine materials can be cooled rapidly in the Roto-Fin Cooler, a new cooling unit of unconventional design. It is said to be ideal for high-temperature applications since heat transfer coefficient is as high as 20 Btu. per hour per square foot —degrees F.

The unit is basically a simple drum fitted with hollow fins or cells lapped to form an Archimedes screw that conveys the material to be cooled the length of the drum. The cells open to the outside of the shell, and as the whole unit rotates, scoop up cold water. Cooling takes place by conduction, and the heated water is discharged to a trough on the opposite side of the drum. Any steam generated by exceptionally hot materials is quickly vented to the atmosphere.

The cooler has a minimum of moving parts requiring maintenance or replacement. It is self-cleaning since the spiral keeps the material moving through the drum. No fans, dust collectors or instruments are required for its operation.

First installation of the Roto-Fin has been in a gypsum plant to reduce kettle stucco from about 375 deg. F. down to 150 deg. F. The unit has been successfully tested to cool finished cement, flue dust and foundry sand. (Link-Belt Co., Prudential Plaza, Chicago 1, Ill.)

Enter 105 on Reader Card

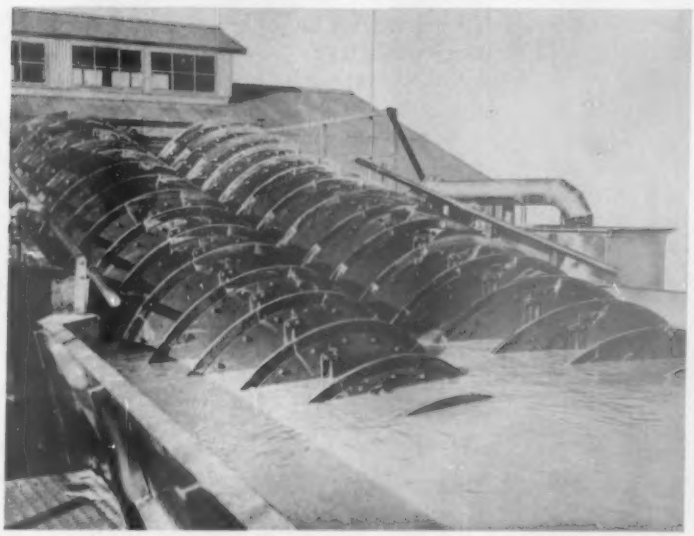
Please turn to page 148

AKINS

the ORIGINAL spiral classifier

proved performance since 1908...

...on closed-circuit grinding, washing, desliming, dewatering, and size separation.



EXPERIENCE

is the key to the outstanding performance of Akins Classifiers. During the past 52 years we have originated and field tested many ideas for improving both the mechanical and metallurgical performance of the Akins Classifier. From this experience, those ideas which have been field-proven to be advantageous are incorporated in the present Akins... the most effective spiral pitch, a trouble-free submerged bearing, best type of tank support, and adaptations, such as side weir, spray water box, serrated wearing shoes, and flared tank, for special applications.

For complete information write for Catalog 601.

Types: standard and submerged spiral; flared tank units for extra large pool; simplex and duplex.

Sizes: 12" to 84" spiral diameter.

Capacities: sand raking: up to 7860 tons for 24 hours; overflow: up to 2386 tons per 24 hours

The Company that cares enough to give you the best!

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Licensed Manufacturers and Sales Agents in Canada, Australia, Sweden, England, South Africa
Sales Agents in Peru, Chile, Philippine Islands, Japan, New York City (for Continental Europe) and in principal cities of the United States.

Enter 1075 on Reader Card

Bowl scraper

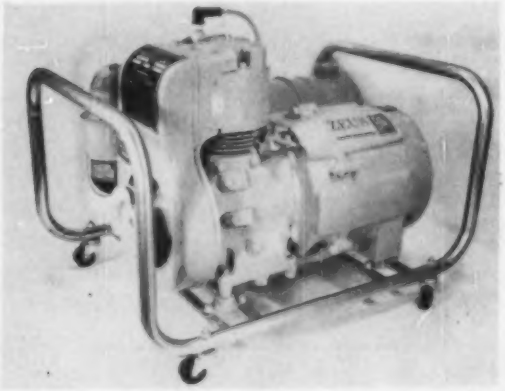
Electric wheels are the prime movers in a new scraper rated at 30 tons. This "small" unit in the maker's line is offered to producers who can use its speed and power to remove overburden or to dig and haul sand and gravel.

A 420-hp. diesel generator supplies the power for the motors in four driving wheels. The maker states that this arrangement gives the bowl a digging ability similar to a continuous crowd on a shovel.

It is possible to operate the unit as a shuttle. There is no need to turn around; the operator and his panel merely swivel around to face the direction of travel. The electric wheels provide the same power and speed in either direction. (R. G. LeTourneau, Inc., 2399 S. MacArthur, Longview, Texas)

Enter 106 on Reader Card

Portable generator



A heavy-duty portable generator is offered to rock products producers to produce 3,000 w. of 115/230 v., 60-cycle single-phase current.

Secret of the Model GW-300's efficiency is a permanent magnet alternator. Power is generated with a permanent magnet rotating field that eliminates brushes, slip rings or commutator. This magnet is an integral part of the engine shaft, is internally cooled and protected from dust or vapor.

The heavy-duty unit is available for either standby power or for continuous-duty applications. Prime mover is a 4-cycle gasoline engine, but an optional conversion kit makes it possible to use butane or propane gas. Accessory equipment makes it possible to operate in confined areas. An auxiliary fuel tank can extend the operating time beyond the normal 5-hr. limit with the integral fuel tank. Reels of electric cable extend the live-power range to 100, 250 or 500 ft. from the unit. (Borg Warner Corp., Pesco Products Div., 24700 N. Miles Rd., Bedford, Ohio)

Enter 107 on Reader Card

Portable dredge

Operators report production savings up to 30¢ a cu. yd. with a new Hydra-Drive sand and gravel dredge. These savings are attributed to a reduction in manpower and auxiliary equipment.

The new dredge has a specially designed ladder with a hydraulically driven cutterhead that can dig up to 60 ft. deep. A range of capacities is available from 75 to 1,500 tph. to pump up to 3,000 ft. from the dredge to the screening plant. (American Marine & Machinery Co. Inc., 201 Woodycrest Ave., Nashville, Tenn.)

Enter 108 on Reader Card

Oil filter element

A new oil filter element has been developed for this manufacturer's diesel engines and machinery. Made of paper, the new 7M3800 filter removes a greater percentage of lubricating oil contaminates than the unit it supplants, yet it offers the same service life. Outward appearance and dimensions of the new element are unchanged. (Caterpillar Tractor Co., Peoria, Ill.)

Enter 109 on Reader Card

Please turn to page 150

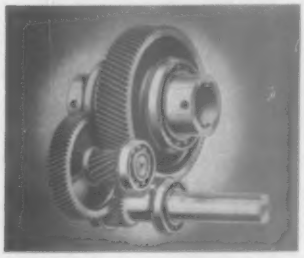
...the quality-engineered package

that simplifies speed reduction

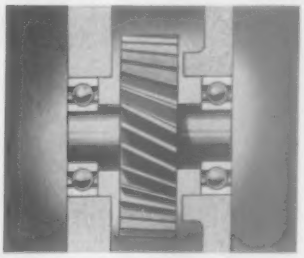
DODGE TORQUE-ARM, America's most widely used shaft mounted speed reducer, will save money for *you.* No foundation, no sliding motor base, no flexible coupling, no installation fuss. Developed and perfected by Dodge, this reducer has been so widely accepted in industry that it is now built and stocked in this unmatched range of sizes and models: capacities up to 170 hp; output speeds from 10 to 400 rpm; ratios of 5:1, 15:1, 25:1; any speed ratio up to 175 to 1. Built-in backstop available. Also positive overload release. Vertical models. Flange mounted models. Special application models... Go modern—go Torque-Arm! See your Dodge Distributor, or write us for complete technical bulletin.

Dodge Manufacturing Corporation, 2600 Union St., Mishawaka, Ind.

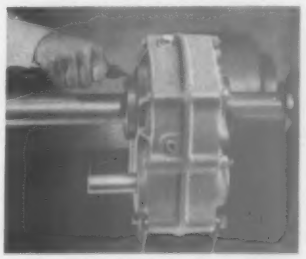
Rugged, semisteel housing holds bearing seats in line for entire life of unit. Laughs at loads. Corrosion resistant.



AGMA rated helical gears. Soft cores withstand shock; hardened surfaces defy wear. Teeth are crown shaved.



Gears are located *between* bearings and carry their loads without strain. Longer life, higher efficiency.



Unit slides completely onto shaft and locks on *both* sides of housing. This baby stays *put*—runs truer longer.

The Products with the Pluses... **DODGE** ***of Mishawaka, Ind.***

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge he can give you valuable assistance on new cost-saving methods.

Enter 1076 on Reader Card

Two-stage compressor

New size and power is offered in a new two-stage compressor with vertical W-type configuration. The 250-hp. water-cooled unit operates at 1,160 rpm. to produce maximum pressure of 125 psi. It has aluminum pistons and high-speed valves. Complete compressors are available with V-belt drive, direct-connected motor or with integral motor. (Gardner-Denver Co., Quincy, Ill.)

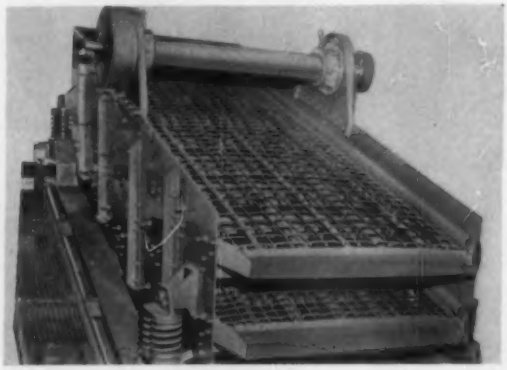
Enter 110 on Reader Card

Sump pump

This new submersible 4-in. pump is offered to handle slurries and other suspensions of solids in water. The entire aluminum-housed pump is submerged in the liquid to be pumped and the motor is sealed in a watertight compartment. The CS-100 pump needs no strainer, and it is not damaged if it runs dry. (Flygt Corp., Hoosick Falls, N.Y.)

Enter 111 on Reader Card

Two-bearing vibrating screen



A heavy-duty, two-bearing vibrating screen is new in every detail to offer the rock products producer a highly efficient screening unit.

Particular attention has been paid to the detail of making screen cloth changes much simpler. Screening efficiency can be improved by changing the placement of the two-bearing vibrating mechanism and by simply selecting one of three speeds for slow, medium or fast operation. At the same time, the ampliture of vibration can be changed by adjusting the counterweight pulleys.

A complete range of screen sizes is offered up to and including 6 x 16 ft. All can be floor or suspension-mounted as determined by installation requirements. (Aggregates Equipment Inc., Leola, Pennsylvania)

Enter 112 on Reader Card

Cone crusher

Rollercone is the name of a 100-percent roller bearing-equipped cone crusher. According to the maker, its mechanism converts nearly all of the crushing pressure to thrust bearings. These bearings are capable of carrying loads over their entire area and can handle greater loads than radial bearings.

Hydro-pneumatic tramp iron protection is another outstanding feature of the crusher. It is capable of passing noncrushable pieces without strain. This protection permits up to twice as much crushing pressure to be exerted and nearly four times the size range of conventional springs.

Two sizes are now available, 45 in. and 36 in. Tests in basalts and granites have demonstrated a capacity of about 135 tph. for the larger unit. It will accept 8-in. rock and reduce it to ½ in. in one pass. The smaller Rollercone has been tested at a capacity of 50 tph. to reduce 4-in. feed to minus ½-in. in one pass. It will accept up to 6-in. rock. (El-Jay Mfg. Co., Inc., 3440 Franklin Blvd., Eugene, Ore.)

Enter 113 on Reader Card

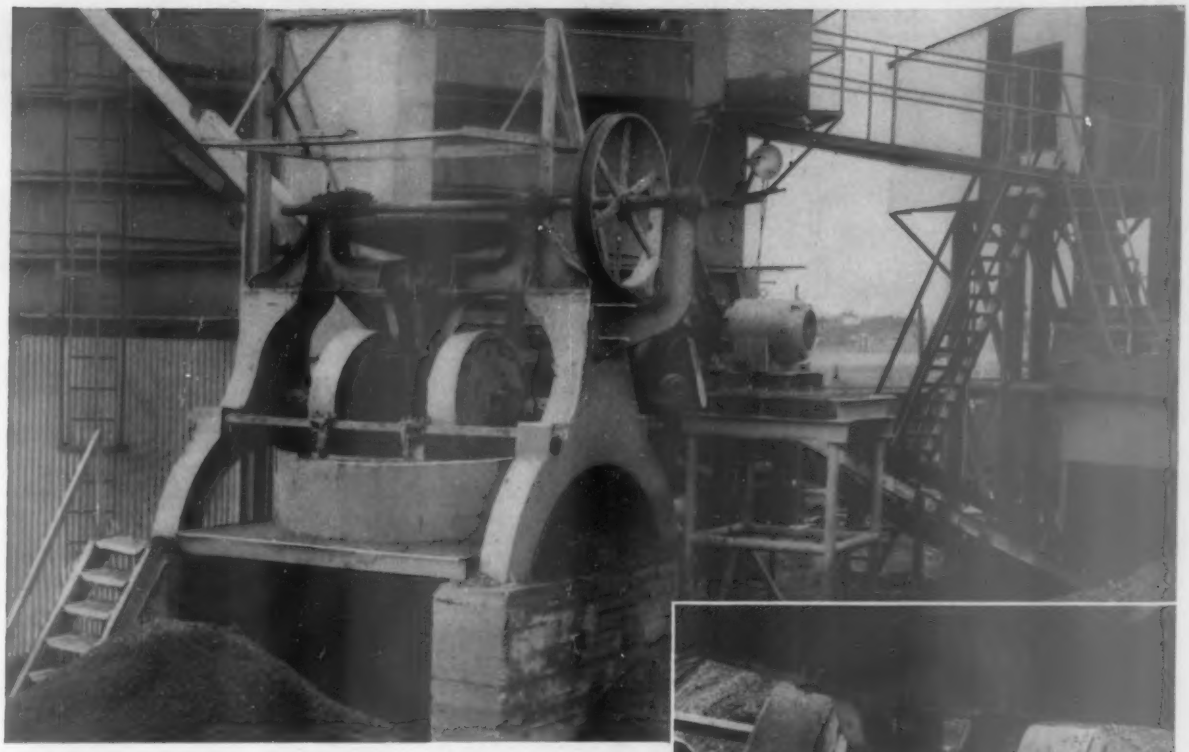
Loader attachment

A new 1¼-cu. yd. attachment is available for this manufacturer's four-wheel tractor. The new attachment digs 94 in. wide, has 8½-ft. dumping height and 9,000-lb. breakout force.

The entire front end of the operating mechanism pivots ahead of the operater to assure the greatest possible safety. Th tractor itself has all-weather four-wheel drive traction with four high-flotation tires of equal size. In addition, it has power steering, four-wheel power brakes and precision hydraulic control of the front end attachment. (Kwik Mix Co., Div. of Koehring Co., 235 W. Grand Ave., Port Washington, Wis.)

Enter 114 on Reader Card

Please turn to page 152



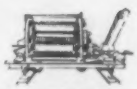
35 YARDS OF HAYDITE PER HOUR

"Our American #9 grinder has ground 35 cubic yards of Haydite per hour and is capable of higher production," comments H. R. Sublett, plant superintendent for Texas Lightweight Aggregate Company of Stafford, Texas. "Our expanded clay is very abrasive, but the American #9 requires much less maintenance than any other type of grinder we could use. The mullers have been used 5 years and are good for 2 more years. That's real service," states Mr. Sublett.

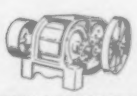
If you need higher grinder production or if grinder maintenance costs are eating up profits—investigate the American #9 grinder—it's designed to increase your profits.

Do Your Job the AMERICAN way

American
CLAY MACHINERY

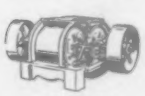

ELECTRIC CUTTERS

PUG MILLS


DISINTEGRATORS

GRINDERS

COMBINATION DE-AIRING MACHINES


SMOOTH ROLL CRUSHERS

DIVISION OF
HUBER-WARCO COMPANY • Marion, Ohio, U. S. A.

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Slurries...handled at lower cost

The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.

Buy WILFLEY for Cost-Saving Performance

A. R. WILFLEY and SONS, Inc.
Denver, Colo., U.S.A.

WILFLEY centrifugal PUMPS

Enter 1068 on Reader Card

T.C. WRITE FOR CATALOG 56

DURABLE ECONOMICAL WOVENWIRE SCREENS KNOWN AROUND THE WORLD

TWIN CITY IRON & WIRE CO.
35 W. WATER STREET | ST. PAUL 7, MINNESOTA

Enter 1069 on Reader Card

PLATEGRIP
PLATE FASTENERS FOR CONVEYOR BELTS

Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" to 1½" thickness. *Write for Catalog Sheet.*

ARMSTRONG BRAY & CO.
5386 Northwest Highway, CHICAGO 30, U.S.A.

Enter 1070 on Reader Card

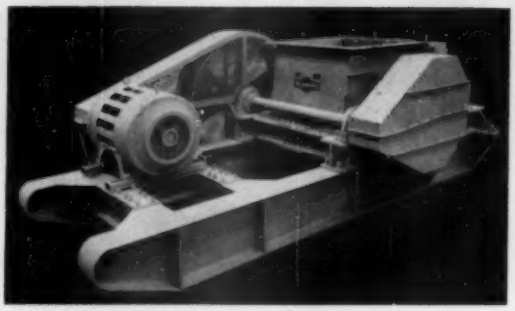
WHAT ARE YOU PAYING FOR REPAIRS?

The money you are paying to keep worn-out equipment working may be just enough for you to own better equipment.

See the **"WHERE TO BUY"** *Section*

NEW MACHINERY

continued from page 150



Skid-mounted machinery

This manufacturer's line of single-roll crushers can now be mounted on structural steel skid bases. In addition to the primary advantage of rolling or moving heavy, awkward assemblies of massive crushers with their drives and motor intact, the skids help to maintain the alignment of bearings and drives. At the same time, the steel base can be more easily secured to concrete foundations or steel structures. (McLanahan & Stone Corp., Hollidaysburg, Pa.)

Enter 115 on Reader Card

Crusher for soft materials

A new single-roll crusher is offered for many of the lower-rated crushing needs of rock products producers. At the same time, the new line includes many of the features of heavy-duty crushers made by this manufacturer. Known as the Atlas, the crusher is ideal for high-capacity reduction of shales, gypsum, phosphate rocks, oolitic and other soft limestones, shells and numerous non-metallic ores. Capacities range between 40 to 600 tph. calling for 20 to 200-hp. drives.

Design features of the new line with crusher rolls of 18, 24 or 30-in. diam. include a contoured breaker plate to take large pieces without clogging, adjustable breaker plate, automatic safety release to prevent damage from tramp iron or hard rock and roller bearings to support the crusher shaft.

A one-piece cast steel roll is shrunk on a forged, heat-treated steel shaft. Roll teeth can be rebuilt or built up without taking the roll out of the crusher or off the shaft. (Pennsylvania Crusher Div., Bath Iron Works Corp., West Chester, Pa.)

Enter 116 on Reader Card

Plastic conveyor belt

A new plastic-impregnated conveyor belt has proven ideal for applications handling wet or abrasive materials. First developed for underground coal mines, the new belt resists tearing and main-

tains traction on the drive pulleys even in wet or damp locations.

The carcass is made of nylon woven both ways in cotton duck to give greater tensile strength. Each strand of yarn is dipped in polyvinyl chloride plastic before it is woven. The whole assembly is then impregnated with the plastic and heat-cured under tension to control stretch.

In addition to its resistance to abrasion and tearing, the new belt is flexible, light in weight, resistant to moisture and mildew and is flame retardant and flame resistant. (Thermoid Div., H. K. Porter Co. Inc., 200 Whitehead Rd., Trenton, N.J.)

Enter 117 on Reader Card

New diesel engines

This manufacturer has extended its line of diesel engines by offering a 145-hp. naturally aspirated engine and a 210-hp. turbocharged engine. The new engines have been designed to meet the needs of rock products producers in trucks, generators and processing equipment.

Fuel economy, easy starting and simple servicing are important features of the new engines. Both have a single-plunger-type fuel injection pump that accurately times and meters fuel. A self-lubricated water pump eliminates packing leaks and servicing problems. Fuel is filtered in two-stage units, while lubrication oil is kept clean by full-flow filters. (Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.)

Enter 118 on Reader Card

Dual-pressure pump

Lubricating oils and greases can be dispensed with a new dual-pressure bucket pump. With the handle in one position, the pump develops 2,000 psi. lubricant pressure; in the high ratio position, about 4,500 psi. The pump delivers lubricant on both up and down strokes in either position.

The red-baked enamel unit has a foot pedal to hold it steady. A knurled thumb screw in the carrying handle permits instant change from low to high pressure. (Lincoln Engineering Co., 4010 Goodfellow Blvd., St. Louis 20, Mo.)

Enter 119 on Reader Card

Push button switch

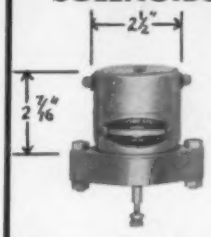
An all-rubber, weather-sealed push button station has been introduced. Known as the Flextite Switch, it is recommended for any 2-station application needing NEMA type 1, 4 or 5 enclosures. The new switch fits all standard FS and FD boxes and flush mounting can be achieved on metal surfaces. Molded rubber construction prevents corrosion and assures complete safety. (Joy Mfg. Co., Electrical Products Div., 1201 Macklind Ave., St. Louis 10, Mo.)

Enter 120 on Reader Card

END

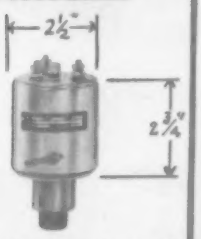
Synchro-Start

HEAVY DUTY D.C. SOLENOIDS



These solenoids are ruggedly constructed, having a life expectancy of over 2,000,000 operations at a rated capacity of 10 lbs. pull. They are available with ½, 1 and 1½ inch stroke.

SPEED SENSITIVE SWITCHES



An extensive line of speed sensitive switches, with various mountings and drives to suit the needs. One or more snap switches contained in a single unit can be furnished to trip at any given speed with an adjustable range for each.

SYNCHRO-START PRODUCTS, INC.
8151 N. RIDGEWAY AVE., SKOKIE, ILL.

Enter 1048 on Reader Card

WIDE ANGLE
93° to 115°
A NEW DESIGN IN
SQUARE SPRAY
FullJet SPRAY NOZZLES
For numerous multiple-nozzle applications, because the square spray patterns "fit together", here are nozzles that make possible uniform, complete coverage with fewer nozzles per manifold. This is the latest design in Spraying Systems' very complete line of FullJet nozzles in square and standard-circular spray patterns. For complete information write for Bulletin 105 and Catalog 24.
SPRAYING SYSTEMS CO.
3285 Randolph Street • Bellwood, Illinois
AMERICA'S MOST COMPLETE LINE OF SPRAY NOZZLES

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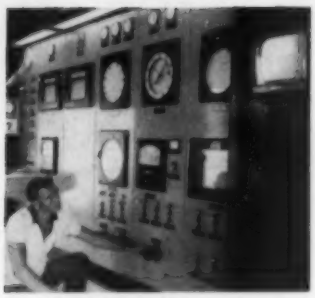
MANUFACTURERS NEWS



Closed circuit TV for kiln operation

VISUAL COMMUNICATIONS through closed circuit television have taken the guesswork out of operating modern cement kilns. The cameras, from General Electric Co., Lynchburg, Va., are installed in fixed positions against the windows and tilted to coincide with the slope of the cooler grates. Wide-angle lenses give the units ample scanning range to view the entire cooling process. And what they see is flashed automatically on a monitor at the master control panel—two floors above and hundreds of feet away. This continuous monitoring thus gives the operator immediate knowledge of what is happening in the cooler.

This TV system detects any build-up of clinker chunks that could choke up the cooler entrance. It discovers threatened overloading of the grate. It warns the operator of overheating. The system is always on the job and the cameras can pick up details in the cooler that would otherwise escape the human eye.

Long-term lease plan

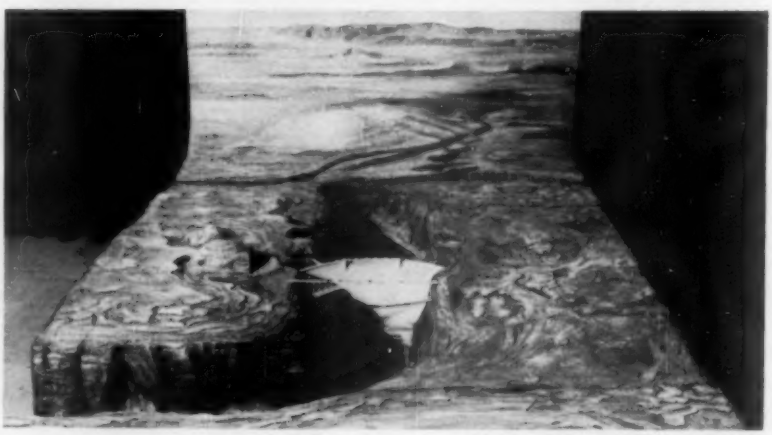
ROCK PRODUCTS PRODUCERS and cement companies can now lease equipment for terms as long as 6 to 12 years under a new plan announced by Nationwide Leasing Co., Chicago, Ill. The extra-long-term lease plan is the first ever offered by a leasing company, Robert Sheridan, president of Nationwide, stated. Up to now, leases have normally ranged from 3 to 5 years. Mr. Sheridan stressed that this plan would free companies from the need to tap long-term debt or equity funds for the smaller amounts involved in acquiring equipment.

The new plan features level quarterly payments for the term of the lease. No security deposit is required. To qualify for this lease, companies must meet the following conditions: They must have a tangible net worth of at least $1 million. They must show a 5-year record of profitable operations. Equipment must have a depreciable life greater than the lease term.

New vp for M & SS

APPOINTMENT OF Wade K. Halvorson as vice president, in charge of the manufacturing division of Mine and Smelter Supply Co., Denver, Colo., has been announced by Albert E. Seep, president. Mr. Seep said the appointment was the result of the company's steady growth and expansion as a manufacturer of equipment for the mining industry. Mr. Halvorson has worked in the Denver office for 16 years. He was appointed director of the manufacturing division earlier this year.

Glen Canyon film tribute premiered by International Harvester



"BRIDGE TO THE FUTURE," International Harvester Co.'s, Chicago, Ill., second film salute to the building of the Glen Canyon Dam, was premiered at the annual convention of the National Reclamation Assoc. in Bakersfield, Calif. The 30-min., 16-mm, full-color, sound production delineates the intermediate phase of work being performed under the largest single prime contract award in the history of the U. S. Dept. of Interior's Bureau of Reclamation—a $108-million undertaking by Merritt-Chapman & Scott Corp. This film, produced entirely by the Harvester Corp., carries the story forward, from the Summer of 1958 to the Summer of 1960, when the first bucket of concrete for the dam was placed. More than three years will be necessary for the concrete work—a project utilizing in excess of 5 million cu. yd. of the material. The dam will create Lake Powell, the result of backing up the Colorado River for 186 mi. Construction will be completed in 1964.

A scale model of the Glen Canyon area (photo) depicting dam and bridge, occupied a display area at the time the film was premiered.

(Continued on page 156)

SYNTRON

CASE HISTORY

another successful application in the

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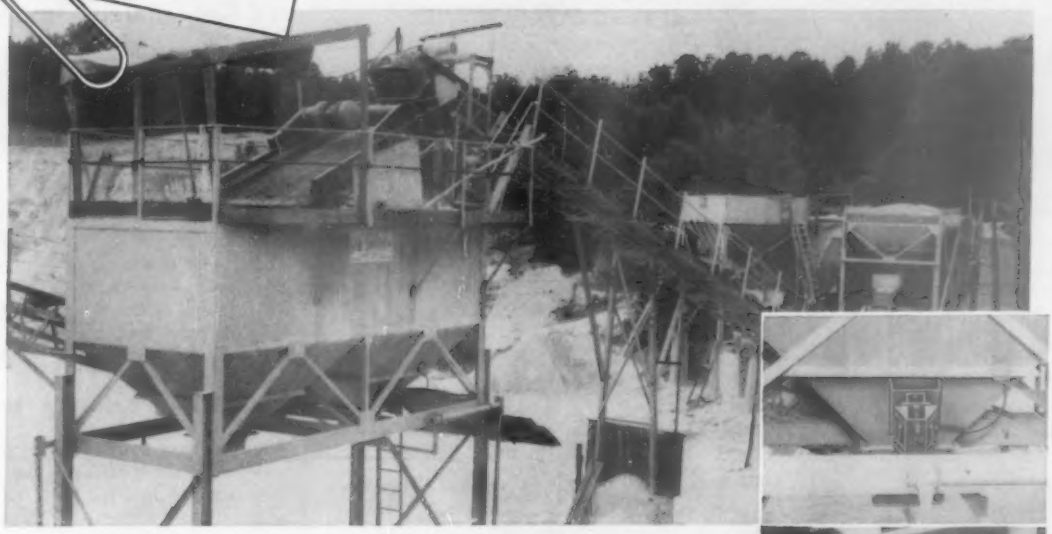
SAND and GRAVEL INDUSTRY



C & L Goodhart—Masonry Sand Producers

get excellent results in every production phase with a

SYNTRON VIBRATOR, FEEDER, GRIZZLY, SCREEN

One of the finest masonry and producing plants in Central Pennsylvania is owned and operated by C & L Goodhart at Walnut Bottom, Pennsylvania. This plant was designed and built by L. B. Smith, Inc., Camp Hill, Pennsylvania and has been in operation since April, 1959.

This plant has an output of approximately 100 tons of high grade masonry sand per hour, with 60 tons produced by the primary crusher circuit and 30 to 40 tons from the secondary hammermill circuit. The process equipment that has helped this plant maintain high production standards and a quality product include—a Model RVS-1510 Rotary Vibrator Screen, a Model F-55DT Vibrating Grizzly, a Model F-33DT Vibratory Feeder, and a Model V-75 Electric Vibrator. All Syntron Equipment.

Syntron equipment has successfully aided C & L Goodhart with materials handling problems—it can do the same for you.

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NEW Type D-T Heavy-Duty "TELLTALE" Centrifugal Sand and Gravel PUMP

In a showdown, the already "Telltale" owner's order gets priority over an order for a new pump. That's a firm "Telltale" policy—insurance against downtime along with lower parts-changing time, higher production, longer wear—minimum cost of production per yard.

AS LOW IN DOWNTIME AS IT IS HIGH IN PRODUCTION

"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pump to lose its prime. Pumping stops. Water leaking through the ports signals that the shell liner and the surrounding belt of packing have worn through.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy-Duty folder and prices.

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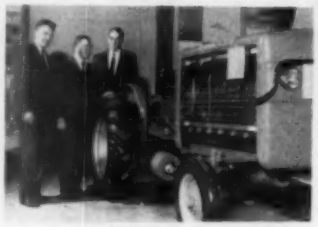
MANUFACTURERS NEWS

(Continued from page 154)



Smithsonian gets first A-C fuel cell tractor

THE WORLD'S FIRST VEHICLE powered by self-contained and controlled fuel cells was recently presented to the Smithsonian Institution, Washington, D.C., by Allis-Chalmers Mfg. Co., Milwaukee, Wis. Frank A. Taylor, (right) director of the Smithsonian's Museum of History and Technology, accepted the vehicle from Will Mitchell, Jr., (left) acting director of Allis-Chalmers research division, in brief ceremonies at the Smithsonian.

The company demonstrated its fuel cell-powered vehicle for the first time a little more than a year ago. In the demonstration, it developed more than 3,000 lb. of drawbar pull. The electricity came from 1,008 individual cells. A mixture of fuel gases and oxygen was fed into the cells. Within the cells, the gases reacted with an electrolyte aided by catalysts. The chemical reactions within the cells caused a direct current to flow through an external circuit to a 20-hp. electric motor.

English company acquired by Leeds & Northrup

LEEDS & NORTHUP CO., Philadelphia, Pa., announced it has acquired all outstanding shares it has not previously owned of Integra, Leeds & Northrup Ltd., of Birmingham, Eng., and this subsidiary has been renamed Leeds & Northrup, Ltd. A substantial additional capital investment is involved, to expedite a program for improvement of plant facilities. Integra, Leeds & Northrup was formed in 1953 when L&N purchased a substantial interest in what had been The Integra Co., Ltd. The parent company is a manufacturer of electronic controls, measuring instruments and heat treating furnaces. Integra makes many of the same products. I. Melville Stein, president of L&N, becomes chairman of the board of Leeds & Northrup, Ltd., in place of Maurice Bouffart, resigned.

(Continued on page 158)

Strength, Economy, Durability Steel

Armco Dredge Pipe Provides Longer Service Life, Lowers Cost

Pit and quarry operators find that Armco Dredge Pipe handles more material and lasts longer at lower cost per foot.

The interior is smooth and highly abrasion resistant.

Put Armco Dredge Pipe in *your* materials handling system. Compare its serviceability with other pipes you have used.

For economy tips on the use of Armco Dredge Pipe, just fill in and mail the coupon. An Armco Sales Engineer will call at your job site without cost or obligation.

Armco Drainage & Metal Products, Inc.
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ARMCO Drainage & Metal Products

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MANUFACTURERS NEWS

(Continued from page 156)

Bucyrus-Erie elects two directors

EUGENE P. BERG and Ernest S. Everitt have been elected to the board of directors, Bucyrus-Erie Co., South Milwaukee, Wis. Mr. Berg joined the company last year in the capacity of executive vice president. Previously, he was general manager of all Chicago operations for the Link Belt Co. Mr. Everitt, a 33-year veteran with the company, is presently managing director of Ruston-Bucyrus Ltd. (an affiliate company in Lincoln, England). He spent two years in the United States at the Bucyrus-Erie Co. in the export sales department. On his return to England in 1937, he resumed his old position as assistant commercial manager which he held until 1939 when he was made export manager.

Hardinge expansion completed

HARDINGE MFG. CO., York, Pa., has announced the completion of a $300,000 foundry modernization and expansion program started in January of 1960. Due to lower construction costs than anticipated, R. E. Long, plant manager, states that additional improvements were possible. These improvements include: an additional new wing on the original building, a motive sand slinger, enlarged cupola charging floor, new core ovens, new sand muller, automatic sand handling and sand storage system, and complete paving of the outside storage area. The Hardinge foundry now has 32,000 sq. ft. of floor area and has a nominal capacity of 250 tons per month.

Ebeling replaces Torson in Dodge's sales dept.

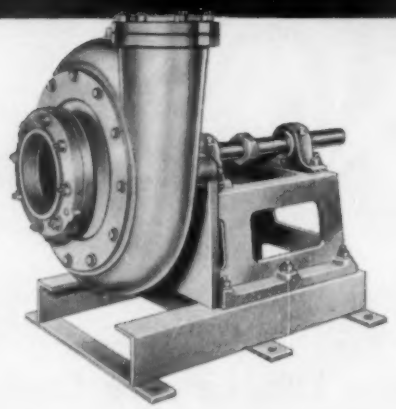
FRED J. EBELING (photo) has been named director of sales for Dodge Mfg. Corp., Mishawake, Ind., with the retirement of Harry A. Torson, vice president in charge of sales. Mr. Torson will continue to render advisory and consulting services to the company on a part-time basis, according to J. Allan MacLean, president, but Mr. Ebeling will have full responsibility for all activities of the sales department, reporting to the president. The company has manufactured mechanical power transmission equipment since the year 1887.

Mr. Torson has headed the company's sales department since 1944. Mr. Ebeling came to the company in 1943. He was transferred to sales in 1952 as general sales manager, and in that position worked closely with Mr. Torson in directing the company's marketing organization.

Fairbanks-Morse buys Howe scale

IT WAS ANNOUNCED that Canadian Fairbanks-Morse Co. has acquired Howe Scale Co. of Rutland, Vt. Howe is one of the largest manufacturers in the U. S. and is a leader in the field of

LOWEST-COST HANDLING of FINE, ABRASIVE SOLIDS



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RUBBER -LINED PUMPS

- No Adjustment Necessary
- Only 3 Wearing Parts
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- *OUTLASTS METAL 5-10 Times on Slurries of 100% Minus ¼"*

LIGHTNING Model RU cuts costs on hydraulic transfer of silica sand, glass sand, coal silt and other fine, abrasive slurries. Initial efficiency remains steady without maintenance. The rubber lining, not affected by abrasion, outlasts any hard, alloyed metal. Model RU is available in 8x10", 6x8", 4x6", or 3x4" size. Its simple design insures maximum endurance and performance.

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electronic weighing systems. It also has a world export division. This is Fairbanks-Morse's first entry into the U. S. market and its first entry into the world export market. Howe Scale Co. will operate in the U. S. as a wholly owned subsidiary of the Canadian company, but Howe's Canadian sales and service organization will be merged with the sales division of the Canadian company.

In September, Canadian Fairbanks-Morse acquired Rudel Machinery Co. Earlier in the year, it acquired Dynamic Engineering Ltd., and Skinner Scales Ltd.

Goes retires from Koehring

E. J. GOES, a veteran of 47 years with Koehring Co., Milwaukee, Wis., has retired from the company. Mr. Goes has held various sales, advertising and publicity posts. He was advertising and publicity manager from 1932 until 1959, directing the advertising and sales promotion activities of all Koehring divisions and subsidiaries. Since 1959, he has been publicity manager, in charge of shows, conventions, exhibits and trade association work. Mr. Goes plans to continue in some phase of advertising, making his long experience to industry on a consulting basis. His duties with Koehring will be taken over by the company's advertising manager, Martin B. Jaeger.

J. I. Case Co. reorganizes industrial div. operations

CONSOLIDATION AND CENTRALIZATION of industrial division operations was announced by D. A. Milligan, vice president, industrial division, J. I. Case Co., Racine, Wis. In the new arrangement, the U. S. will be separated into three sales divisions, with a fourth in Canada. Strategically located regional offices are being established in Syracuse, Atlanta, Racine, Dallas and San Francisco. In Canada, they will be located in Toronto and Regina. All activity relating to industrial orders, credit, billing and accounting will be handled in the Racine central office. Sales and service management will be conducted from the regional offices.

ESCO adopts new name

ESCO CORP. is the new name for the 47-year old Portland, Oregon, firm formerly known as Electric Steel Foundry Co. The name change has been under consideration for some time, since ESCO's expansion into fields other than the foundry business has resulted in the foundry connotation becoming a source of confusion to many customers. The main plant and offices are located in Portland.

"Jeep" sales rise

DOMESTIC "JEEP" VEHICLE sales to dealers established an all-time high for Willys Motors, Inc., during September, it was announced by Cruse W. Moss, vice president in charge of sales.

END

KOLMAN Radial Stackers Minimize Material Segregation

100'x24" Stacker is one of four Kolman Stackers used in the production of aggregate at Squaw Valley, California, in preparation of roads and site for the 1960 Winter Olympic Games. Stackers in the background are 70'x24".

PNEUMATIC-TIRED STACKERS IN LENGTHS UP TO 150 FEET

Reports of outstanding performance by the Kolman Model 101-R Radial Stacker are rolling in from all parts of the country. Owners are enthusiastic about bonus features offered by the Kolman Stacker — features like cable suspension of the boom, two-position wheels, balanced electric drive on the head section, power lift, power travel, and cam hinge. Sizes up to 150 feet long build larger stockpiles with a single setting.

MINIMUM SEGREGATION

Kolman's cable suspension design eliminates the segregation encountered with stackers having fixed discharge heights. By raising the stacker as the pile is built, the fall of material is kept at a minimum.

MAXIMUM PORTABILITY

Even the largest Kolman Stackers are on dual pneumatic tires that roll easily on any level surface. Wheel assembles are mounted in quick-change frames to easily shift from radial arc position for stacking to parallel position for moving from one location to another in the stockpile area.

150'x30" Stacker shown includes electric power lift and electric power travel for finger-tip control of stacker discharge position.

100'x24" Stacker in the background stockpiles sand produced with an 8'x48" double-deck vibrating screen on a Model 101 Kolman Portable Conveyor-Screen Plant.

WRITE FOR LITERATURE

KOLMAN MANUFACTURING CO.

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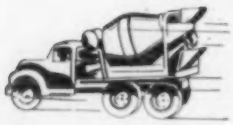

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By

James A. Nicholson

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MAKE MONEY
BUY THIS EQUIPMENT

QUARRY EQUIPMENT

Telsmith 2536 Primary Crushing Plant
Cedarapids 4033 Hammermill Secondary unit
Pioneer 305W Washing & Screening Plant
Kennedy 37½ Gearless Gyratory. New Condition
2—Cedarapids 4033 Hammermills. Rebuilt
Cedarapids 3033 Hammermill. Remanufactured
Cedarapids 2033 Hammermill. Rebuilt
Cedarapids 16' open inclined bucket elevator
Telsmith Pulsator, 4' x 12', 3-deck screen
Telsmith Vibro-King, 4' x 13', 3-deck screen
Cedarapids 5' x 12', 2-deck Inclined Screen
Aggregates 4' x 14', 3-deck Inclined Screen
2—Syntron F-44 Vibratory Feeders
Cedarapids 30-S, 3-compartment charging hopper. New
Smithco 10-Yd. Portable Charging Bin
Eagle 10' x 24' Scalping Tank
6' x 12', 8' x 18', 13' x 23' bins in stock
18", 24", 30", 36" conveyors & belting
Smithco 30" x 34', 7½ H.P. Belt Conveyor

SHOVELS AND CRANES

Lorain L-50K, 1-yd. Diesel Shovel
Lorain L-36, ¾-yd. Diesel Backhoe
Osgood 200, ½-yd. Gas Clam-Crane
Link Belt LS71, ¾-yard Gas Clam-Crane
Insley K-12, ½-yd. Gas Backhoe
2—Lorain TL-20, ½-yd. Gas Shovel or Hoe
Lorain TL-30J, Gas Backhoe
Bucyrus-Erie 10B, ⅜-yd. Gas Shovel
Lorain MC-530W, 35-ton Moto-Crane
Lorain SP-424, 22½-ton Self-Propelled Crane
Lorain MC-414, 20-ton Moto-Crane
Lorain MC-4, 15-ton Moto-Crane
Lorain SP-110, 10-ton Self-Propelled Crane
Michigan TLDT-20, 10-ton Truck Crane
Lorain MC-254, 15-ton Moto-Crane
Lorain TL-20-MC, Moto-Crane
Lorain TL-20, 10-ton Moto-Crane
Lorain SP-107, 7-ton Self-Propelled Crane

TRUCKS, TRACTORS, SCRAPERS

20—Euclid 66TD, 27-ton Rear Dumps
6—Euclid 65TD, 27-ton Rear Dumps
1—Euclid 91FD, 15-ton Rear Dump
2—Euclid 13-yd. Bottom Dumps. Good
1—Euclid Tractor with 3200 Gallon Water Tank
1—Caterpillar D-8 with Push Block
1—Caterpillar D-7 with Cable Bulldozer
1—Caterpillar D-7 with Hydraulic Angledozer
1—Caterpillar D-6 with Hydraulic Bulldozer
1—Caterpillar D-6 with Hydraulic Angledozer
1—Caterpillar HT-4, 1 1½-yd. Traxcavator
1—Caterpillar D-4 Tractor Only
2—Euclid TC-12 Twin Engine Tractors
1—International TD-24 with Cable Angledozer
1—International TD-18 with Hydraulic Angledozer
1—International TD-14, 2¼-yd. Front End Loader
1—Letourneau Super C. Tournadozer. Excellent
3—Letourneau CR. 12-yd. Tournapulls
1—Allis-Chalmers HD-15 with Cable Bulldozer
4—International 2T75, 15-yd. Scrapers
2—Allis-Chalmers TS-360, 15-yd. Scrapers
1—Euclid TS-24, 24-yd. Twin Engine Scraper
1—Euclid 15½-yd. Six Wheel Scraper
5—Euclid 7-yd. Overhung Engine Scrapers
1—Adams 412H Diesel Grader. Reconditioned

Inquire for list of drilling equipment, air compressors, diesel power units, generators, shovel & backhoe attachments.

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1—Allis Chalmers 9' x 130' Rotary Kiln ¾" shell.
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2—Allis Chalmers 7'6" x 7' x 125' Rotary Kilns.
1—Allis Chalmers 4' x 40' Rotary Kiln ⅝" shell.
1—Traylor 8' x 80' Rotary Dryer ⅝" shell.
1—Vulcan 8' x 80' Rotary Dryer ½" shell.
2—RotoLouvre Dryers 6'4" x 24'.
1—Rennenburg 6' x 50' Rotary Dryer ⅜" shell.
1—Louisville 6' x 48' Rotary Dryer, ⅜" shell, oil fired.
2—Bonnet 6' x 40' Rotary Dryers ½" shell.
3—Davis 6' x 25' Rotary Dryers ½" shell.
1—Ruggles Cole 5' x 30' Rotary Dryer ⅜" shell.
1—Allis Chalmers 4' x 30' Rotary Dryer ⅜" shell.
1—3' x 36' Rotary Dryer ⅜" shell.
1—34" x 30' Rotary Dryer ⅜" shell.

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1—Raymond #5057 Five Roll High Side Mill, 7' double whizzer separator.
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1—Traylor 42" x 18" double roll crusher.
1—Allis Chalmers 36" x 16" double roll crusher.
4—Sturtevant 30" x 16" double roll crushers.
3—Traylor 30" x 14" double roll crushers.
1—Penn Hammermill, size 5060, Hopper opening 60" x 24".
1—Penn. Super-Thor Hammermill, size SXT-13, 250 H.P.
1—Kennedy Van Saun 4'6" x 9' Ball Mill.

AIR SEPARATORS - SCREENS

1—16' dia. Raymond Whizzer separator with 50 H.P. motor.
1—8' Raymond Whizzer Separator with 15 H.P. motor.
1—6' x 14' Link Belt double deck Vibrating Screen.
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3 Allis Chalmers (2 compartment) 7'x22' Compeb Mills with Meehanite liners; each directly coupled to 400 H.P. Motor.

1 Allis Chalmers 9'6" Continuous Ball Mill; or PRELIMINATOR with Meehanite liner; directly coupled to 400 H.P. Motor.

3 Allis Chalmers 7'x22' Continuous Tube Mills; with three 14' Raymond Double Whizzer Air Classifiers; each mill directly coupled to a 400 H.P. 3/60/2200 V 180 RPM Motor.

3 Raymond 14' Mechanical Air Separators with Double Whizzers, new in 1950. Each Separator V-Belted to a 75 H.P. Motor.

All Mills and Classifiers were operated in CLOSED CIRCUIT.

Also available are Steel Enclosed Bucket Elevators and Screw Conveyors.

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Slightly used Stephens-Adamson 5 H.P. Heavy Duty—Max. Lump 6" 150 TPH—Very Reasonable.

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P&H Model 150 ½ yd. Clamshell Crawler Crane w/Cat. D-311 engine

Link Belt LS-85 shovel	8' CMETCO #202 Rola Paver	D-311 Cat. Diesel eng. power Unit
Bay City #25 ⅛ yd. hoe	4x10 Telsmith d.d. screen	Quickway J backhoe on ½ track
Lima 34 Paymaster backhoe	Hoe attach. for Koehring 304	Insley K-12 ½ yd. backhoe & drag
Lorain 41¾ yd. dragline	Koehring 205 clam & backhoe	524T trencher w/2-way conveyor
Amer. #375 ¾ yd. dragline	Terratrac G300 w/backhoe	Minn-Moline 1 yd. hyd. loader UTI

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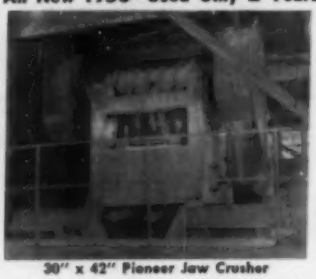

30" x 42" Pioneer Jaw Crusher

CRUSHERS—2—30"x42" Pioneer Roller Bearing Jaw crusher. All welded steel frame. Manganese jaws, V-belt drive, 125 hp. Elliot TEFC motors. 440 V. Complete with Clark combination starter. Excellent Condition.

SCREENS—3—6'x14' Hewitt Robins Model MH-11 Vibrex heavy duty scalping screens Single deck, floor mounted. V-belt drive by 20 hp. Elliott Induction motors TEFC, 440 V. with magnetic switches.

FEEDERS—2—60"x16'3" Pioneer Orofeeders extra heavy duty supermang pans, 60" wide x 15" pitch. Spurgear and chain drive thru Model 120 DHA Jones speed reducer and 20 hp. U. S. Vari-drive motors. Includes 5' high steel plate skirt board. 2100 tons per hour.

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1—60"x30' C.C. Hewitt Robins belt conveyor. Steel frame with skirt boards. Chain drive by 80 SHA Jones speed reducer, and 40 hp. Elliot motor, TEFC 440 V., less belt.

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1 4" Wilfley "K" Sand Pump
1 48" Wemco Sand Classifier
1 48" Wemco Duplex Sand Classifier
1 Farrell-Bacon 30" x 15" Jaw Crusher
1 10 H.P. Capston Car Puller
26" and 28" Belt Conveyors Complete
1 100 H.P. Model 420 Schramm Compressor

ALEX MUSHKIN

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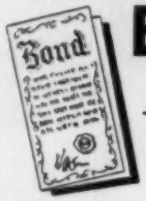
Phones:—Moosic Glenwood 7-5446
Scranton Diamond 7-7100

DIESEL ELECTRIC LOCOMOTIVES

GE 80-ton
GE 70-ton
Whitcomb 44-ton

BIRMINGHAM RAIL & LOCOMOTIVE CO.
P. O. Box 391, Birmingham, Alabama



Bonded Equipment Bargains

WRITE, WIRE OR PHONE FOR FREE CATALOG AND PRICES
CURRENT MODELS - IMMEDIATE SHIPMENT FROM OUR FACTORY

TROUGHING IDLER CONVEYOR BARGAINS

8" Jr. I Beam Frame Conveyors

Truss Frame Conveyors

Built Like A Bridge For High Tonnages Clear Spans to 50 Ft.—Any Length—Any Belt Width

Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2¼" or 2½" diameter shaft.

We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, 1/16" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1138.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1139 AND PRICES.**

JR. I BEAM CONVEYOR PRICES

Conveyor Prices Include Belting

Belt Width	Conveyor Length	Sale Price	Add or Deduct Per Foot
14"	25'	$ 766	
14"	50'	1181	$16.62
14"	85'	1763	
16"	20'	700	
16"	45'	1128	
16"	60'	1384	17.10
16"	90'	1897	
16"	150'	2923	
18"	25'	830	
18"	45'	1190	
18"	70'	1641	
18"	85'	1912	18.03
18"	100'	2182	
18"	130'	2723	
18"	200'	3985	
20"	25'	871	
20"	60'	1546	
20"	75'	1836	19.30
20"	90'	2125	
24"	25'	922	
24"	45'	1335	
24"	70'	1852	
24"	100'	2473	20.68
24"	120'	2886	
24"	150'	3507	
24"	200'	4540	
30"	50'	1591	
30"	70'	2054	
30"	90'	2518	23.17
30"	140'	3676	
36"	25'	1105	
36"	45'	1623	
36"	60'	2012	25.91
36"	100'	3048	

Other lengths and belt widths priced upon application. **BONDED 30" DEEP TRUSS CONVEYORS** also in heavy duty Portable Models. Available with Screen and Feeder and with mast or mastless type undercarriage and hydraulic powered mechanism. Lengths to 60 feet and belt widths through 30 inches. Equipped with Tow Hitch for easy moving from one job-site to another. **PRICED FROM $2365.**

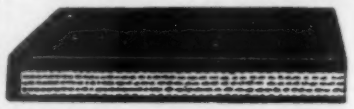
TESTED CONVEYOR BELTING

WE PAY FREIGHT ON 200 POUNDS OR OVER PLUS AN ADDITIONAL 10% SAVINGS FROM SALE PRICE FOR FULL ROLLS 500 TO 650 FEET.

All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLES & BULL. #1279



MAJOR BRAND: 12# to 15# Friction Pull. 800# to 1000# Cover Tensile. Heavy Duty. 28 oz. duck. 1/16" top x 1/32" bottom rubber covers. Tough cotton duck, strong carcass and proper flexibility. Used in moving boxes, bags, coal, sand, gravel, crushed stone, salt, earth and similar materials.

Width	Ply	U. S. Made Per Foot
14"	4	$3.06
16"	4	3.21
18"	4	3.56
20"	4	4.11
24"	4	4.61
30"	4	5.64
36"	4	6.69

MAJOR BEE BRAND: 16# to 19# Friction Pull. 2400# to 3000# Cover Tensile. Skim Coat Between Plies. A high grade of heavy duty, 28 oz. duck with 1/16" top x 1/32" bottom rubber covers. For severe service and abrasion resistance. For stone, mineral ores, concrete, cement and coal.

Width	Ply	U.S. Made Per Foot	Special Imported Belt Per Foot
16"	4	$3.74	$3.23
18"	4	4.14	3.59
20"	4	4.72	4.15
24"	4	5.35	4.67
30"	4	6.56	5.75
24"	5	6.25	5.41

WRITE US FOR YOUR ELEVATOR BELT AND CHUTE LINING REQUIREMENTS

ELEVATOR BELT is of heavy duck carcass with smooth tough rubber or friction surface on one or both sides. Can be furnished with or without bucket holes punched and cemented. Write for full information and prices. **CHUTE LINING** is of high-tensile, abrasion-resisting quality. Recommended for Chute and Launder Lining, Conveyor Belt Scrapers, Conveyor Skirt Boards, Die-Press or Bumper Stock, Hoppers, Bins and other metal surfaces exposed to the action of abrasion materials.

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3-roll, 5" diameter Troughing Idlers for:

14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50

1-roll, 5" diameter Return Rolls for:

14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

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8' x 60' x ½" Welded Rotary Kiln
6' x 120' x ½" Vulcan Rotary Kiln
4' x 35' Rotary Dryer New Shell
4' x 47' x $\frac{5}{16}$" Mosser Rotary Dryer
6' x 25'; 6' x 50' Louisville Rotary Dryers
8'8" x 70' Ruggles Cole Dryer
8' x 11' Traylor Ball Mill Steel Lined
7' x 24' Allis-Chalmers Tube Mill
#5060 Dixie Mogul Hammermill
SX13 Penna. Hammermills, 400 HP
Heil Patterson Crushers, 100 HP
Raymond #50 & #40 Impact Mills
36" x 42" Koppers 2 Roll Crushers
36" x 48"; 20" x 6" Jaw Crushers
3'x3'x12' Horiz.; 4'x9'x12' Vert. Puggers
27" x 24" Komarek-Greaves Brig. Presses
20" x 40"; 30" x 96"; 40" x 48" Screens
535'—24" Troughing Belt Conveyor
Bucket Elevators 45' to 90' Centers
100 Steel Tanks, 1000 to 350,000 gal.

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DIESEL LOCOMOTIVES, CRANES & CARS
18—115, 80, 70, 65, 45, 25, 20, 10 & 8 ton Diesel Locomotives
500—50 & 70 ton Gondola & Box Cars
25 ton Amer. Diesel Loco Crane
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5' x 25', 6' x 72', 8' x 60', 9' x 160', 10' x 78', 5' x 35' Ruggles-Coles XA-8 Dbl. Shell.
8' x 125' & 36" x 30' Ruggles Rotary Kilns
2', 3', 4', 5½' & 7' Symons Cones
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40 x 33 Cedar Rapids Hammermill
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4 x 8, 4 x 12 & 6 x 16 Vib. Screens
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4' 0" Traylor Type TY-Gyratory
18" x 36", 18" x 30", 24" x 36" Jaw Crushers.
48", 20" Traylor Primary Gyratory Crushers
2—20" Allis-Chalmers S.McC. Gyratory Crs.
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2A Cedar Rapids Port. 24 x 16 Roll Crusher
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TEL. MU 2-3076 & 2-1898

AMERICA'S LARGEST STOCK ROT. DRYERS - KILNS

10' x 11' x 175' Vulcan Kiln, $\frac{13}{16}$"
10' x 78' National dryers, ¾"
8'-8" x 70' Hardinge, ⅝" welded
8' x 60' rotary kiln, ½" welded
8' x 60' Davenport, $\frac{7}{16}$" welded
8' x 56' rotary kiln, ½" welded.
8' x 40' Stearns-Roger dryers, ½"
7'-6" x 62' kiln, ½" welded
7' x 60' Bonnet dryer, ⅝"
6' x 7' x 100' kiln, ½" shell
6' x 52' Bonnet dryer, $\frac{7}{16}$"
6' x 50' Louisville steam-tube
6' x 25' Louisville steam-tube
4'-6" x 40' Ruggles-Coles dryer
4'-9" x 32' dryers, ⅜" shell
3'-6" x 21' rotary dryer, ⅜" welded.
3' x 23' Standard dryer, ½"

MUST BE MOVED!

Vulcan 10' x 11' x 175' long rotary kiln, $\frac{13}{16}$" shell, 2-tires, firing hood, etc.

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Denver 5' x 10' rod mill, 150 HP.
Hardinge 8' x 48" conical pebble, 75 HP
Hardinge 7' x 36" conical pebble
Hardinge 6' x 48" conical ball, 75 HP
Allis-Chalmers 6' x 18' pebble-tube
Allis-Chalmers 6' x 16' ball-tube
Allis-Chalmers 5' x 22' ball-tube
Allis-Chalmers 5' x 5' ball, 75 HP

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Symons 2' standard cone crusher
Farrel 36" x 15" jaw crushers
Buchanan 24" x 13" jaw, 50 HP
Farrel 20" x 6" jaw, 30 HP
Mitchell 18" x 9" jaw, 25 HP
Sturtevant 8" x 10" jaw
Babcock & Wilcox #32E ball type pulv., air-swept, 75 HP
Raymond 66" 6-roller mill, 200 HP
Raymond 50", 5-roller, hi-side mill
Dixie #5060 hammermill, 500 HP
Amer. #38-S rolling ring crusher
Wms. 36 x 24 hammermill, 50 HP
Robinson #13 sawtooth crusher, 15 HP
Pa. #C330 rever. hammermill, 60 HP

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Komarek-Greaves briquett presses
Rotex 40" x 84" 2-deck screen.
Tyler 4' x 6' hummer screens
Elevators, 50' high, steel buckets, rubber belt
Elevators, 95' high, 14" x 7" steel buckets, chain, casing, 7½ HP TEFC drive
Conveyor, 24" x 538' troughing belt, 20 HP drive
Conveyor, 18" x 50' drag conveyor, 2 HP drive
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Owens ¾ cu. yd. clam-shell buckets

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"OUR 53RD YEAR"

Iowa 25 Yd. Portable Crushing Plant.
Lancaster "Iroquois" Pug Mills (2).
Traylor Ball Mill 6x8
Colorado Iron Ball Mill 6x4
Pennsylvania Hammermill 30x24, M-2
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Denver Lab. Jaw Crusher 3¼" x 4½"
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Farrel Jaw Crusher 36x18
New England Jaw Crusher 14" x 28"
Acme Jaw Crusher 14x26, Steel Frame.
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New Holland Plate Feeder 24" x 60"
500' -9" Screw Conveyor complete with ends, hangers, gearmotors.
22" Magnetic Pulleys.
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DRYERS: One 5' x 25 ft. and one 3' x 33 ft.

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SCREEN: Simplicity 3' x 10', 3 deck, 5 H.P.

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2,000,000 ft.	2"	3,50# to the foot
1,000,000 ft.	3"	7,70#
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500,000 ft.	6"	19,80#
200,000 ft.	8⅝"	28#
400,000 ft.	10¾"	35#
75,000 ft.	12¾"	40#
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All No. 1 Grade plain end and cleaned.

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Will trade unit for 50' 36" conveyor with vibrator.

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1—Rotary dryer 6' x 56', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment

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New, clean "F", "D", "H", "200", "400", "600", "700" and "1000" thread specifications.
All sizes—Not War Surplus.
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All sizes, new and rebuilt. Starters, accessories, pulleys and repair parts. Gear motors, Shaft mounted Speed Reducers, Falk couplings and V-belt drives.
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Imported—14", 16", 18", 20", 24", 30"
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46" Stedman 2 Cage
4 Row Disintegrator
Pulverizing Mill
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All Drives and Electric Motors For Complete Plant. Plant Used On One Job Only—750,000 Tons—10 Months. Very Good Condition. Terms to Responsible Party.

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1—7' x 35' Comp. mill & motor.
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2—16' Sturtevant air separators & motors.
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#1 and #0 Raymond mills.
1—6' x 50' dryer.
1—New 8' x 175' kiln.

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Barber-Greene Model 543 Bucket Loader S/N 543-5016 w/LeRoi D-226 S/N 25X9015
Butler 38 Cu. Yd. 11' Dia. 1 Compartment Low Cement Bin with #7 Elevator X 28'6" S/N 7845
Symons Horizontal Vibrating Double Deck Screen w/Dust Housing (80 TPH) 36"x10' Complete with 7½ HP Motor and V Belt Drive

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50 Haarlem Avenue, White Plains, N.Y.
Tel: WHite Plains 9-2110

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LARGE DRAGLINES, SHOVELS, CRANES, ROTARY DRILLS, EUCLID DUMP TRUCKS
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Hazleton National Bank Building, Hazleton Pa.
Phone GL 5-3658

SPECIALS!!!

Fuller-Kenyon Conveying system pump type H3-7
Fuller Kenyon Airslide cement conveying system
Fuller Kinyon Type V-200 Rotary Vacuum Pump
Fuller Kinyon Bulk Cement Type "D" Unloader with 1000' 8" pipe. 150 HP motor, two Fuller Compressors 3" type pump
Marina equipment, dredges, shovels, cranes.
Eagle Log Washer 48"x30' Model BMD
Eagle 30"x10' dbl. screen washer, w/drives
Telsmith 84"x12' Super Scrubber

MILLS—CRUSHERS—KILNS—DRYERS

JAW: Reliance, 14x24, Buchanan 18x36, 30x42, Type C 30x42. Cedar Rapids 2036, Traylor 28x36, 36x48, 56x72. Lippman 24x36; Universal 30x42; Superior McCully 42x40.
GYRATORY: Al. Chal. 9, 8K, 10", 16, Gates 12K; Traylor TZ Kennedy Van Saun 27½.
CONE: Symons 3', 4¼', 5½', Kue-Ken 36"; Traylor TY4; Telsmith 3', 26"
ROLL: Cedar Rapids 34x16, 55x30; Al. Chal. 37x16, 42x16. Pioneer 40x22, 40x24 triple, 54x24; Telsmith 40x22; Universal 30x18; Lippman 40x20.
MILLS—ROD—Denver 4x8, 4x10; Hardinge 4x10; Marcy 3x8, 5x12.
TUBE: Al. Chal. 6x22, Smidth 5½x20, 6'6"x21; Hardinge 4½x16" 8x18"; 8x9'; 8x36; 8x48; 10x48.
HAMMERMILLS: Penn SXT-350 HP motor, 6XR 10'x6'7"; Stedman 24x20, 36x42; Cedar Rapids 50-50, 2033, 30x33, 30x42 double; Dixie 36x50.
AUTOCLAVES: J&C 6'6"x58" 8' dia. x 123'
KILNS: 6'x50', 6'x120', 9'x100', 8x134'.
DRYERS: 6'x40, 6x60, 6x72.
BALL MILLS: 4½'x16", 6'x28", 8'x48"

CRUSHING PLANTS

Pioneer Port. 3436 jaw 4022 twin roll 36"x30' apron feeder. Murphy Diesel.
Universal 4024 roll port. Diesel. New 1958.
C-R 2236 jaw, Port. double deck grizzly. Diesel. heavy duty feeder.
Diamond Port. 2036 jaw. Heavy tandem.
C-R 2236 Port. 125 HP motor.
C-R 3A-GR Port. 22x36 jaw Diesel.
C-R 36" x 45" double Impeller Breaker, feeder, grizzly.
Universal 3042 jaw, 4024 roll Diesel Port.

CONCRETE PLANTS

Johnson 150 ton 3 compt. aggr. cement 1500 Noble CA-104-100 4 compt. 300 CF cement silo
Johnson TY 400-300 yd bin 4 aggr. 1 cement. Koehring mixer. 3 yd batcher.
Erie Strayer 120 tons aggr. bin, 380 bbls. cement
Noble CA-854 4 compt. large capacity. Complete
Noble CA-506, 500 tons 6 compt. aggr., 2000 ft. cem. silo.
Smith 84-S 3 yd. Tilt-Mixer, 40 HP AC motor.
Johnson 505, TY1-56, 200 yds; 3 compt. aggr. 356 bbls.
2 Koehring 56 Mixers.
Heltzel 100 ton 3 compt. aggr. 600 bbls. cement

DREDGES

Morris 6" Diesel on 14'x36' hull
Ellicott 14" x 12" Steel Hull 64' x 32' Diesel.
10" Portable Diesel powered. Complete.
Amsco 12" suc. 10" Dis. Hull 24'x50' Diesel-Elec.
Ellicott 8" with cutter. Diesel Hull 48'x18'x3'6"
8" Hydraulic Diesel. On 32'x28' steel pontoons
6" portable Diesel complete with cutters, etc.

SCREENS

Tyler-Hummer 4'x10' one Deck
New Symons 3'x12' 5 HP Elec. Motor.
Simplicity 5'x14' double deck
Cedar Rapids 4'x12' dbl. deck 25 H.P. elec. motor
Pioneer 5'x12' 2 deck 20 H.P. elec. motor
C-R 4'x14' 2 deck 25 HP motor

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CO 7-0723 Cable: RICHWALSH

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WANTED
CRUSHING PLANT EQUIPMENT
L. B. SMITH INC.
CAMP HILL, PENNA.

WANTED
Hydrocone Crusher, Model 530, must be in good condition and late model. Interested in 40-hp motor and reduced line voltage starter for same.
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Tel: Buffalo NT 4-1432

WANTED
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Prominent manufacturer of CRUSHER and PROCESS MACHINERY has challenging opportunity for Sales and Service Representative covering the territory of Southern California and Arizona.

Must have minimum of 5 years machinery sales experience in mining, crushed stone, sand and gravel or cement industries.

Prefer graduate engineer but will consider technical background and experience in Mechanical, Metallurgical, or Mining Engineering in lieu of degree.

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Write stating age, education, experience and salary requirement. Replies strictly confidential.

Box S-89, Rock Products, 79 W. Monroe, Chicago 3, Ill.

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Ideal living conditions and job opportunities. Must have previous Gypsum Quality control experience and should be college graduate. Rocky Mountain location of western building materials manufacturer.

Box S-81, Rock Products
79 W. Monroe St., Chicago 3, Ill.

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WANTED

Leading manufacture of crushing cement and lime plant machinery requires service and erection representative. In reply give education, experience and salary required. All communications confidential. Box S-87, Rock Products, 79 West Monroe St., Chicago 3, Ill.

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NOTES FROM THE PUBLISHER

February, 1961

Dear Reader:

It seems to me that people are only talking "gloom" these days. This is probably the most absurd attitude for anyone to take toward our business outlook.

I have yet to speak with any authority who does not look to the future with the brightest of hopes. It is the consensus that the next 10 to 15 years are going to show the greatest economic growth this country has ever experienced.

Sure, we might be in a bit of a dip or sideway movement at this point, but the future IS bright.

If we all start conditioning our thinking to be on the positive side, we are going to reach this pinnacle of good business much faster.

With the road program developing more rapidly, with the outlook for housing for 1961 at 1,400,000 units, plus an increased public works program, I can't see anything but good business for all of us.

The next time we sit around a luncheon table or at a business meeting, let's all say: "What a bright future!" And let's forget the gloomy talk.

This time next year when I meet with you through this page, I hope and fully expect all of us to be experiencing the best business ever, and —most of all—to be looking forward to even better times.

Sincerely,

Philip D. Allen

Philip D. Allen
Publisher

LE ROI LRD-3 for powerful, deephole rotary drilling

Here's the *big* rig . . . completely self-contained for putting down hole as large as 7⅞ in. to 100 ft. depth!

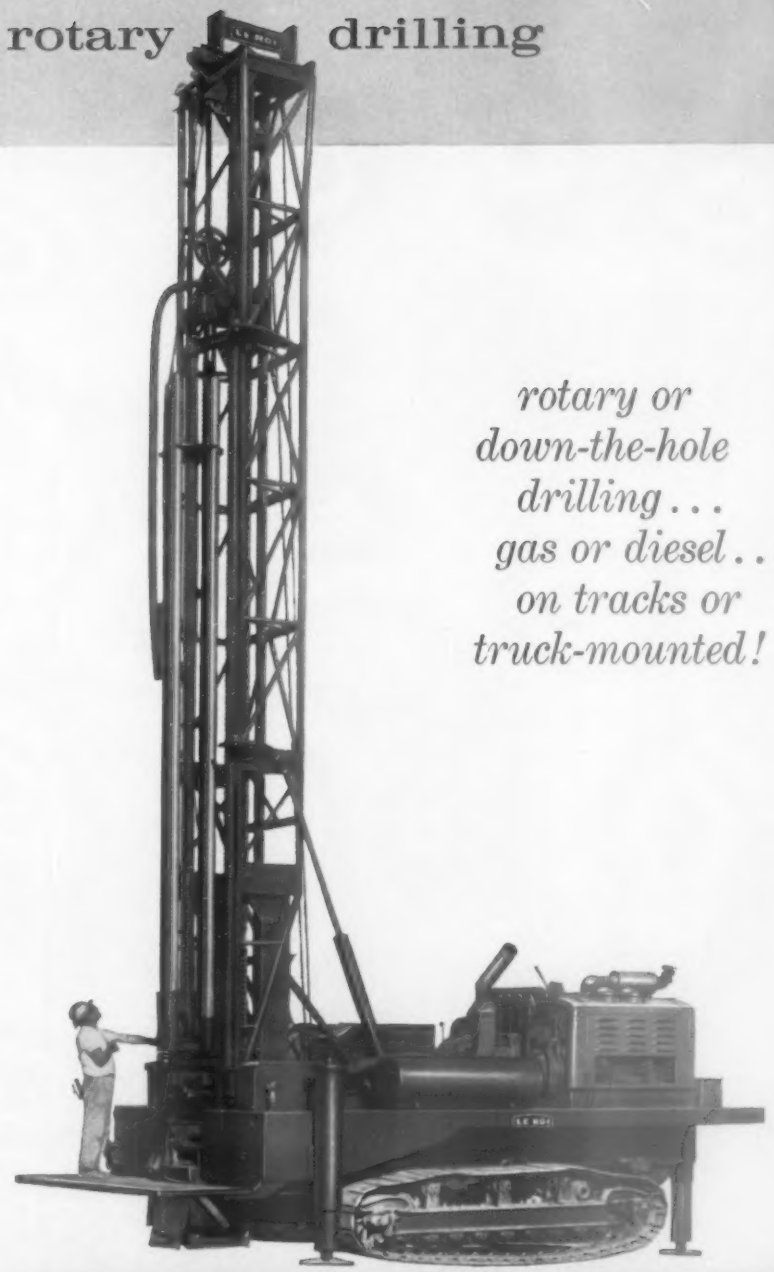
The LRD-3 is available with either crawler or truck mounting. An enclosed cab can be furnished to provide all-weather protection for the operator while drilling. All controls are conveniently grouped for easy operation and good visibility.

The traveling head design of the LRD-3 provides positive mechanical power without excessive torque loss under heavy pulldown, and permits easy control in making up and breaking down drill pipe. Every function of the unit is designed to speed productive drilling and keep the operator making hole. Leveling, raising the mast, and even the automatic drill pipe magazine are hydraulically controlled for speedy operation. A powerful dust collector traps cuttings and blows them well away from the unit.

An extra-sturdy 4-speed chain-hydraulic pulldown puts up to 30,000 lbs. of pressure on the bit of the LRD-3. A rugged dual-range transmission provides rotary speeds from 9 to 168 rpm in a selection of 10 forward and 2 reverse speeds.

Where needed, the rotary bit can be quickly changed for a powerful down-the-hole drill. A Le Roi 100 hp dual-manifold air compressor provides plenty of 100 psi air for punching through tough rock with the down-the-hole drill, or it can be set to deliver 625 cfm of 40 psi air for fast, efficient removal of cuttings in rotary operation.

The LRD-3 comes complete with a hydraulically operated magazine with capacity for four 20 ft. drill pipes, and can be equipped with such optional equipment as lights for night-time operation, a mounted bit grinder, air hoist, breakout tongs, water injection system, etc. Specification Sheet AT-147 describes the unit in detail, with complete spec information. Send for a copy.



rotary or down-the-hole drilling . . . gas or diesel . . . on tracks or truck-mounted!

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